

APPENDIX A  
BOREHOLE LOGS



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 2

PROJECT NAME Atkemix Ten, Louisville, KY  
PROJECT NUMBER 008319  
CLIENT Atkemix Ten Inc  
LOCATION Louisville, KY

HOLE DESIGNATION: B-117  
DATE COMPLETED: June 26, 2007  
DRILLING METHOD: HSA  
FIELD PERSONNEL: Jason Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	453.22					
2	ML/CL - SILT and CLAY, firm to stiff, low plasticity, brown, dry, cohesive		1	X	83	26	0
4			2	X	75	8	0
6							
8							
10	SM - SILTY SAND, loose, fine grained, poorly graded, brown, wet, odor	443.72	3	X	96	6	0
12							
14			4	X	92	W/H	279
16	ML - SILT, little fine sand, soft to firm, wet, odor	438.22					
18			5	X	96	W/H	3860
20	- little free product on split-spoon at 20.8ft BGS						
22							
24			6	X	92	2	1780
26	- little free product on sample at 25.7ft BGS						
28							
30	CL/ML - CLAY and SILT, soft to firm, medium plasticity, gray, moist, cohesive, no odor	423.72	7	X	100	5	0
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE  
WATER FOUND ☒ 6/26/2007  
CHEMICAL ANALYSIS ☐

OVERBURDEN LOG 8319 SVE-AREA BORINGS GPO CRA CORP GDT B12/03

# STRATIGRAPHIC LOG (OVERBURDEN)

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PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-117  
DATE COMPLETED: June 26, 2007  
DRILLING METHOD: HSA  
FIELD PERSONNEL: Jason Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N' VALUE	PID (ppm)
34							
36	SP - SAND, loose, medium grained, poorly graded, brown, damp, odor	418.22	8	X	92	8	0
38							
40	SW - SAND, trace gravel, loose, medium to coarse grained sand, tan-brown, dry, odor	413.22	9	X	92	18	2342
42							
44							
46			10	X	71	23	83
48							
50			11	X	75	20	33
52							
54							
56			12	X	100	23	16
58							
60	- wet, odor at 59.5ft BGS						
62	END OF BOREHOLE @ 61.0ft BGS	392.22	13	X	100	31	0
64							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
WATER FOUND ☒ 6/26/2007  
CHEMICAL ANALYSIS ☐

OVERBURDEN LOG B-117 SVE AREA BORINGS GPJ CRA CORP GDI 8/12/08



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-119  
DATE COMPLETED: June 26, 2007  
DRILLING METHOD: HSA  
FIELD PERSONNEL: Jason Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PtD (ppm)
	GROUND SURFACE	429.64					
2	SM - SAND and SILT, loose to compact, fine grained, well graded, brown, dry		1	X	58	11	0
4	ML/CL - SILT and CLAY, firm to stiff, low plasticity, brown, dry	425.64	2	X	54	11	0
6							
8	END OF BOREHOLE @ 8.0 ft BGS	421.64	3	X	67	11	0
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 8319 SVE AREA BORINGS GPJ CRA CORP GUT 8/12/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-120

PROJECT NUMBER: 008319

DATE COMPLETED: June 26, 2007

CLIENT: Atkemix Ten Inc

DRILLING METHOD: HSA

LOCATION: Louisville, KY

FIELD PERSONNEL: Jason Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	437.87					
2	ML - SILT loose to compact, brown, dry		1	X	75	7	0
4			2	X	75	15	0
6			3	X	33	6	0
8	END OF BOREHOLE @ 8.0ft BGS	429.87					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG R-319 SVE-AREA BORINGS (SPJ) CRA CORP. GDT B-1308

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-121  
DATE COMPLETED: June 26, 2007  
DRILLING METHOD: HSA  
FIELD PERSONNEL: Jason Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	436.20					
2	SM/ML SAND and SILT, compact, fine grained, well graded, brown, dry		1	X	83	23	16
4	ML/CL - firm, low plasticity, cohesive	432.20	2	X	75	11	0
6			3	X	92	10	0
8	END OF BOREHOLE @ 8.0 ft BGS	428.20					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG B319 SVE AREA BORINGS OF 1 CRA CORP GDT 8/12/09

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-122  
DATE COMPLETED: November 14, 2007  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	443.00					
2	CL-CLAY with sand, fine grained, poorly graded, orange-brown - black seam from 0.4 to 0.6 ft bgs containing black granular material at 0.4 ft BGS	442.10					
	Black seam of angular granular material	441.50					
	CL/SP-CLAY and SAND, stiff, fine grained, poorly graded, orange-brown, moist, black mottled staining	441.00	1	P/S	100		0
4	CL-CLAY, stiff, orange-brown, moist, trace black flakes						
	CL-CLAY, firm, orange-brown, moist to very moist, trace black staining	439.00					
6							
			3	P/S	100		0
8	END OF BOREHOLE @ 8.0 ft BGS	435.00					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG B319 SVE AREA BORINGS CPU CRA CORP COT 8/12/08



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME Atkernix Ten, Louisville, KY  
PROJECT NUMBER 008319  
CLIENT Atkernix Ten Inc.  
LOCATION Louisville, KY

HOLE DESIGNATION B-123  
DATE COMPLETED November 14, 2007  
DRILLING METHOD Geoprobe  
FIELD PERSONNEL J. Hoffmann

DEPTH # BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV # AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	448.13					
	CL/GW-CLAY and GRAVEL, fine to medium grained, brown, moist	446.83					
2	Black seam of angular granular material, some rounded granular material	445.43	1	P/S	100		0
	SP-SAND, fine grained, poorly graded, moist, orange-brown	444.13					
4	Black seam of angular granular material	443.93					
	SP-SAND, fine grained, poorly graded, orange-brown, wet	443.43					
	CL-CLAY, firm, orange-brown, wet	442.33	2	P/S	100		0
6	SP-SAND, fine grained, poorly graded, orange-brown, wet	441.63					
	CL-CLAY, firm, orange-brown, wet	440.13					
8	END OF BOREHOLE @ 8.0# BGS						
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG, 3315 SVE AREA BORINGS GPJ, CRA, CORP. G&T, 8/1/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: C08319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-124  
DATE COMPLETED: November 14, 2007  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PI/D (ppm)
	GROUND SURFACE	433.67					
-2	SM-SILTY SAND, fine grained, poorly graded, orange brown, dry to moist		1.2	P/S	100		0
-4	CL-SANDY CLAY, fine grained, orange-brown, moist - some black angular flakes at 4.0ft BGS	430.67					
-6	CL-CLAY, very stiff, orange-brown, moist - slight black staining at 6.0ft BGS	428.67	J	P/S	100		0
-8	END OF BOREHOLE @ 8.0ft BGS	425.67					
-10							
-12							
-14							
-16							
-18							
-20							
-22							
-24							
-26							
-28							
-30							
-32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG B-124 SVE AREA BORINGS GPJ CRA CORP GDT B-124/DB

# STRATIGRAPHIC LOG (OVERBURDEN)

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PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-125  
DATE COMPLETED: November 14, 2007  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	GROUND SURFACE	431.51					
2	CL/SP-CLAY and SAND, trace gravel, fine grained sand, poorly graded, orange-brown, moist	431.01					
	CL-CLAY with SAND, stiff, fine-grained, poorly graded sand, orange brown, moist	429.61	1, 2	P/S	100		0
	CL-CLAY with SAND, stiff, fine-grained, poorly graded, orange-brown, moist	428.91					
4	CL/SP CLAY and SAND, fine grained, poorly graded, orange-brown, moist, trace black flakes	427.91					
	CL-CLAY, stiff, orange-brown, moist						
6	- same except trace gravel at 4.0 ft BGS		3	P/S	100		0
8	END OF BOREHOLE @ 8.0 ft BGS	423.51					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG #310 SVF AREA BORINGS GPJ CRA CORP GDI 3/12/06

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-126

PROJECT NUMBER: 008319

DATE COMPLETED: November 14, 2007

CLIENT: Atkemix Ten Inc

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	430.80					
	SC-SAND with CLAY, fine grained, poorly graded, orange-brown, moist						
	CL-CLAY, trace gravel, stiff orange-brown, moist	430.00					
2	SC-SAND with CLAY, fine grained, poorly graded, orange-brown, moist	429.20	1.2	P/S	100		0
4	CL-CLAY, trace sand, fine-grained, poorly graded, brown, moist, trace black flakes	426.80					
6	- black staining at 6.2ft BGS		3	P/S	100		0
8	END OF BOREHOLE @ 8.0ft BGS	422.80					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG B319 SVE AREA BORINGS GP1 CRA CORP GDT 8/1/2008



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-127  
DATE COMPLETED: November 14, 2007  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	431.86					
2	SC-CLAYEY SAND, fine-grained, poorly graded, orange-brown, trace black flakes, trace vegetation - black seam of coarse angular granular material, with some rounded, seam 0.2 inch wide at 1.2 ft BGS	429.96 429.66	1	P/S	100		0
4	CL-CLAY, stiff, brown, moist, trace vegetation SC/CL-CLAYEY SAND/SANDY CLAY, fine-grained, poorly graded, moist, trace vegetation - black flake at 2.7 ft BGS	427.86					
6	CL-CLAY with SAND, fine-grained, poorly graded, orange-brown, moist, trace black flakes or staining		3	P/S	100		0
8	END OF BOREHOLE @ 8.0 ft BGS	423.86					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG B3119 SVE AREA BORINGS GPJ CPA CORP GDI B42003



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-128

PROJECT NUMBER: 008319

DATE COMPLETED: November 15, 2007

CLIENT: Atkemix Ten Inc.

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE			
			NUMBER	INTERVAL	REC (%)	PID (ppm)
	GROUND SURFACE	426.47				
	CL/GC- CLAY and GRAVEL, fine to medium-grained, moist					
2	CL/SM- CLAY and SAND, fine grained, dry to moist, orange-brown, trace black flakes	425.47	17	P/S	100	0
4	same except no black flakes	422.47				
	CL-CLAY, firm to stiff, orange-brown	422.17				
6			3	P/S	100	0
8	END OF BOREHOLE @ 8.0ft BGS	418.47				
10						
12						
14						
16						
18						
20						
22						
24						
26						
28						
30						
32						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



OVERBURDEN LOG B-128 SVL AREA BORINGS GPJ CRA CORE CDT 8/12/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-129  
DATE COMPLETED: November 15, 2007  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	'N' VALUE	PIU (ppm)
	GROUND SURFACE	453.56					
2	CL-CLAY with SAND, fine-grained, poorly graded, orange-brown, dry to moist, trace vegetation		17	P/S	100		0
4	SC/CL-SAND and CLAY, fine-grained, poorly graded, orange-brown, dry to moist, black mottled stains	449.56					
6			3	P/S	100		0
8	END OF BOREHOLE @ 8.0 ft BGS	445.56					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG B5114-SVE-ARFA-BORINGS-GPJ CRA-CORP-GDT 8/12/03

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-130  
DATE COMPLETED: November 15, 2007  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	P/D (ppm)
	GROUND SURFACE	454.98					
2	TOPSOIL with GRAVEL CL/SC-CLAY and SAND, fine-grained, poorly graded, orange-brown, dry to moist	454.48	1	P/S	100		0
4	SC/CL-SAND and CLAY, fine-grained, poorly graded, orange-brown, dry to moist	450.98	3	P/S	100		0
8	END OF BOREHOLE @ 8.0 ft BGS	446.98					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

OVERBURDEN LOG 8319 SVE AREA BORINGS GPJ CRA CORP G01 B11204

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME Atkemix Ten Louisville, KY

HOLE DESIGNATION: B-131

PROJECT NUMBER 008319

DATE COMPLETED: May 14, 2008

CLIENT: Atkemix Ten Inc

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	453.91					
	GP/SP-GRAVEL and SAND, fine-grained sand	453.01	1	P/S			0
2	CL/SP-CLAY and SAND, fine-grained sand, orange-brown, moist, trace black coal		2	P/S			0
4							
6			3	P/S			0
8	END OF BOREHOLE @ 8 ft BGS	445.91					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE, REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 8319 SVE AREA BORINGS GPJ CRA CORP GDT BTL/08



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-132

PROJECT NUMBER: 008319

DATE COMPLETED May 14, 2008

CLIENT: Atkemix Ten Inc.

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N-VALUE	PI/D (ppm)
	GROUND SURFACE	456.22					
	CL/SP. CLAY and SAND, firm, fine grained sand, brown-orange, moist, trace black coal		1	P/S			0
2	same except soft	454.22					
4	same except firm	453.22	2	P/S			0
6	same except soft	451.42					
8	END OF BOREHOLE @ 8.0ft BGS	448.22	3	P/S			0
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG 2019 SVE AREA BORINGS GPJ CRA CORP GOT 2/12/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME Atkemix Ten Louisville, KY

HOLE DESIGNATION B-133

PROJECT NUMBER 008319

DATE COMPLETED May 14, 2008

CLIENT Atkemix Ten Inc.

DRILLING METHOD Geoprobe

LOCATION Louisville, KY

FIELD PERSONNEL J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PiD (ppm)
	GROUND SURFACE	450.39					
2	SLAG and SAND, black, round pellets	449.39		P/S			0
4	CL CLAY, some sand, very soft, fine grained, orange brown, moist						
6				P/S			0
8	END OF BOREHOLE @ 8.0 ft BGS	442.39					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



OVERBURDEN LOG B-133 SVE AREA BORINGS UPJ CRA CORP LOG B-133

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-134  
DATE COMPLETED: May 14, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N-VALUE	PID (ppm)
	GROUND SURFACE	453.15					
	SLAG and SAND, black, round pellets	452.55					
2	CL-CLAY, little to some fine-grained sand, plastic, orange-brown, moist, trace black coal		1	P/S			0
4							
6							
8			2	P/S			0
	END OF BOREHOLE @ 8.0ft BGS	445.15					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 8319 SVE AREA BORINGS GFL CRA CORP GDT 5/12/08



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-135  
DATE COMPLETED: May 14, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N' VALUE	PID (ppm)
	GROUND SURFACE	454.11					
	CL CLAY, little sand, brown-orange	453.61					
	SLAG, black, round pellets	452.71					
	GP-Gravel, gray, angular	452.41					
2	CL-Clay, little to some fine-grained sand, plastic, brown gray, moist, trace black coal	451.61	1	P/S			NR
	same except gray						
4	same except orange-brown	450.11					
6			2	P/S			NR
8	END OF BOREHOLE @ 8.0 ft BGS	446.11					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 8319 SVE AREA BORINGS 12/17/08 CRA CORP. 001 8/1/2008

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-136  
DATE COMPLETED: May 14, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N' VALUE	PID (ppm)
	GROUND SURFACE	455.54					
	TOPSOIL	455.34	1	P/S			0
2	CL-CLAY, little to some fine-grained sand, plastic, brown-orange, moist						
4			2	P/S			0
6	SP-SC-SAND, little clay, fine-grained, brown-orange	450.54					
8	END OF BOREHOLE @ 8.0ft BGS	447.54	3	P/S			0
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG: 8319 SVE AREA BORINGS CPU TRA CORP GDT R/12/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-137

PROJECT NUMBER: 008319

DATE COMPLETED: May 13, 2008

CLIENT: Atkemix Ten Inc.

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N' VALUE	PID (ppm)
	GROUND SURFACE	452.49					
	TOP SOIL	451.69					
2	CL, SP. CLAY, little to some sand, plastic, brown orange, trace black coal		1	P/S			0
4							
6			2	P/S			0
8	END OF BOREHOLE @ 8.0 ft BGS	444.49					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG B-137 SVE AREA BORINGS GPJ (PRA, LORP, RDT) 5/12/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkernix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkernix Ten Inc  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-138  
DATE COMPLETED: May 13, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	451.32					
	CL. CLAY, little sand, plastic, brown, moist		1	P/S			0
2	very plastic, light brown, trace black coal	450.12					
	very firm, brown, trace black coal	449.72	2	P/S			0
4							
6							
8			3	P/S			0
	END OF BOREHOLE @ 8.0 ft BGS	443.32					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG: B310 SVE AREA BORINGS GPU CRA CORP GDT 8/12/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-139  
DATE COMPLETED: May 13, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	'N VALUE	P/D (ppm)
	GROUND SURFACE	451.47					
	CL-CLAY, little to some sand, plastic, gray-orange, moist, trace black coal		1	P/S			NR
2			2	P/S			NR
4							
6			3	P/S			NR
8	END OF BOREHOLE @ 3.0ft BGS	443.47					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG: 8319 SVE AREA BORINGS GPJ CRA CORP (JDT) 8/12/09



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-140  
DATE COMPLETED: May 13, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	428.33					
	ML-SILT, little sand, brown, moist, trace black coal		1	P/S			0
2	CL-CLAY, little sand, brown, moist, trace black coal	427.13	2	P/S			0
4							
6							
8	END OF BOREHOLE @ 8.0 ft BGS	420.33	3	P/S			0
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG B319 SVE AREA BORINGS GPJ CRA CORP GDT 8/13/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-141  
DATE COMPLETED: May 13, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	425.38					
	ML-SILT, little fine-grained sand, dark brown, dry to moist	424.68	1	P/S			0
2	CL-CLAY, little fine-grained sand, dark brown, dry to moist		2	P/S			0
4							
6			3	P/S			0
8	END OF BOREHOLE @ 8.0ft BGS	417.38					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG B-141-SVE AREA BORINGS (PJ, CRA, CORP) GDT: 8/12/08

# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-142  
DATE COMPLETED: May 13, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	423.66					
	TOPSOIL and WOOD	423.36	1	P/S			0
	GP GRAVEL						
2	COBBLES	422.06					
4							
6	GP GRAVEL, little clay, gray	418.16					
	CL-CLAY, brown, dry to moist	417.66	2	P/S			0
8	END OF BOREHOLE @ 8.0 ft BGS	415.66					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG 6311 SVE AREA BORINGS GPJ CRA CORP GDT 04/12/08



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-143  
DATE COMPLETED: May 13, 2008  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N-VALUE	PID (ppm)
	GROUND SURFACE	417.10					
2	CL CLAY, little fine-grained sand, plastic, brown-orange, moist		1	P/S			0
4			2	P/S			0.1
6	same except trace black coal, slight chemical odor	412.20					
8	same except gray	409.30	3	P/S			6.5
	END OF BOREHOLE @ 8.0ft BGS	409.10					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 8319 SVE-AREA BOPINGSS (PJ) CHA CURP GDT 8/12/08



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-144

PROJECT NUMBER: 008319

DATE COMPLETED: May 14, 2008

CLIENT: Atkemix Ten Inc.

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J. Hoffmann

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N VALUE	PID (ppm)
	GROUND SURFACE	NA					
	SLAG and SAND, black pellets		1	P/S			0
2	CL-CLAY, some sand, soft, fine-grained, orange-brown, moist	0.90	2	P/S			0
4							
6	CL/SP-CLAY and SAND, loose, fine-grained, orange-brown, moist	6.50	3	P/S			0
8	END OF BOREHOLE @ 8.0 ft BGS	8.00					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

OVERBURDEN LOG 8319 SVE AREA BORINGS GPJ CPA CORP GDL 8/12/08



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Alkemix Ten

PROJECT NUMBER: 8319

CLIENT: Alkemix Ten


LOCATION: Louisville, Kentucky

HOLE DESIGNATION: SS-141


DATE COMPLETED: February 5, 2009

DRILLING METHOD: Geoprobe

FIELD PERSONNEL: J. Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	ML SILT, little medium grained sand, firm, brown, dry		 Bentonite Chips	1GP	P/S	1.0		0
	END OF BOREHOLE @ 1.0ft BGS	1.00						
2								
4								
6								
8								
10								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS 

OVERBURDEN LOG 8319.GPJ CRA\_CORP.GDT 2/9/09




# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)


Page 1 of 1

PROJECT NAME: Atkemix Ten  
PROJECT NUMBER: 8319  
CLIENT: Atkemix Ten  
LOCATION: Louisville, Kentucky

HOLE DESIGNATION: SS-142  
DATE COMPLETED: February 5, 2009  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	ML SILT, cohesive, firm, brown, dry							
	END OF BOREHOLE @ 1.0ft BGS	1.00	 Bentonite Chips	1GP	P/S	1.0		0
2								
4								
6								
8								
10								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS 

OVERBURDEN LOG 8319.GPJ CRA CORP.GDT 2/9/09



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten

PROJECT NUMBER: 8319

CLIENT: Atkemix Ten

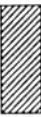
LOCATION: Louisville, Kentucky

HOLE DESIGNATION: SS-143

DATE COMPLETED: February 5, 2009

DRILLING METHOD: Geoprobe

FIELD PERSONNEL: J. Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	SM SILT and SAND, very fine grained, slightly consolidated, brown, dry		 Bentonite Chips	1GP	P/S	1.0		0
	END OF BOREHOLE @ 1.0ft BGS	1.00						
2								
4								
6								
8								
10								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



OVERBURDEN LOG 8319.GPJ CRA CORP.GDT 2/9/09





# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-145

PROJECT NUMBER: 008319

DATE COMPLETED: January 27, 2009

CLIENT: Atkemix Ten Inc.

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J.Hoffman

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE				
			NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.40					
	SW SAND - with gravel, fine to coarse grained, well graded, gray	1.00					
2	CL CLAY - with little to some sand, medium grained, poorly graded, brown to orange, moist, firm		1	P/S	87		0
4							
	SM SAND - little clay, medium grained, poorly graded, brown, moist	4.00					
6			2	P/S	75		0
8	END OF BOREHOLE @ 8.0ft BGS	8.00					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 8319 SVE AREA BORINGS.GPJ CRA\_CORP.GDT 5/7/09



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten  
PROJECT NUMBER: 8319  
CLIENT: Atkemix Ten  
LOCATION: Louisville, Kentucky

HOLE DESIGNATION: B-146  
DATE COMPLETED: February 5, 2009  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J. Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	N' VALUE	PID (ppm)
	ML SILT, little clay, cohesive, firm			0-1'				
2				1GP	P/S	3.0		0
				2-4'				
4			Bentonite Chips					
6				2GP	P/S	4.0		0
				6-8'				
8	END OF BOREHOLE @ 8.0ft BGS	8.00						
10								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



OVERBURDEN LOG 8319.GPJ CRA\_CORP.GDT 2/9/09



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

PROJECT NUMBER: 008319

CLIENT: Atkemix Ten Inc.

LOCATION: Louisville, KY

HOLE DESIGNATION: B-147

DATE COMPLETED: January 27, 2009

DRILLING METHOD: Geoprobe

FIELD PERSONNEL: J.Hoffman

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE				
			NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
	TOPSOIL	0.30					
2	CL CLAY - some medium grained sand, low plasticity, brown to orange, moist, firm		1	P/S	92		0
4							
6			2	P/S	87		0
8	SW SAND - medium grained, well graded, brown to orange, moist	7.10					
	END OF BOREHOLE @ 8.0ft BGS	8.00					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 8319 SVE-AREA BORINGS.GPJ CRA\_CORP.GDT 5/7/09





# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY

HOLE DESIGNATION: B-148

PROJECT NUMBER: 008319

DATE COMPLETED: January 27, 2009

CLIENT: Atkemix Ten Inc.

DRILLING METHOD: Geoprobe

LOCATION: Louisville, KY

FIELD PERSONNEL: J.Hoffman

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE				
			NUMBER	INTERVAL	REC (%)	'N' VALUE	PID (ppm)
2	CL CLAY - little to some medium grained sand, low plasticity, brown to orange, stiff - black staining, coal pieces at 0.7ft BGS	4.00	1	P/S	87		0
4	- wood pieces at 3.4ft BGS						
	END OF BOREHOLE @ 4.0ft BGS						
6	Refusal at 4 ft BGS						
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 8319 SVE-AREA BORINGS.GPJ CRA\_CORP.GDT 5/7/09



# STRATIGRAPHIC LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten, Louisville, KY  
PROJECT NUMBER: 008319  
CLIENT: Atkemix Ten Inc.  
LOCATION: Louisville, KY

HOLE DESIGNATION: B-149  
DATE COMPLETED: January 27, 2009  
DRILLING METHOD: Geoprobe  
FIELD PERSONNEL: J.Hoffman

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE				
			NUMBER	INTERVAL	REC (%)	N' VALUE	PID (ppm)
	TOPSOIL						
	CL CLAY - with medium grained sand, low plasticity, light gray, moist, soft	0.80					
2	CL CLAY - with medium grained sand, low plasticity, gray to orange, stiff to firm	2.10	1	P/S	87		0
4	CL CLAY - little medium grained sand, low plasticity, brown, moist, firm	4.00					
6	CL CLAY - little to some sand, low plasticity, brown to gray, moist, soft	6.20	2	P/S	100		0
8	END OF BOREHOLE @ 8.0ft BGS	8.00					
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 8319 SVE:AREA BORINGS.GPJ CRA CORP GDT 5/7/09



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten

PROJECT NUMBER: 8319

CLIENT: Atkemix Ten

LOCATION: Louisville, Kentucky

HOLE DESIGNATION: B-150

DATE COMPLETED: February 5, 2009

DRILLING METHOD: Geoprobe

FIELD PERSONNEL: J. Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
2	ML SILT, trace clay, cohesive, firm, brown, dry			1GP	P/S	2.0		0
				2-4'				
4	CL/ML CLAY and SILT, cohesive, firm, low plasticity, brown, dry	4.00	Bentonite Chips	2GP	P/S	4.0		0
				6-8'				
8	END OF BOREHOLE @ 8.0ft BGS	8.00						
10								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



OVERBURDEN LOG 8319.GPJ CRA CORP.GDT 2/9/09



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

Page 1 of 1

PROJECT NAME: Atkemix Ten

PROJECT NUMBER: 8319

CLIENT: Atkemix Ten

LOCATION: Louisville, Kentucky

HOLE DESIGNATION: B-151

DATE COMPLETED: February 5, 2009

DRILLING METHOD: Geoprobe

FIELD PERSONNEL: J. Close

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	N' VALUE	PID (ppm)
	ML SILT, little clay, cohesive, firm, brown, dry			0-1'				
2				1GP	P/S	2.5		0
				2-4'				
4								
6				2GP	P/S	4.0		0
				6-8'				
8	END OF BOREHOLE @ 8.0ft BGS	8.00						
10								

OVERBURDEN LOG 8319.GPJ CRA CORP.GDT 2/9/09

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ☐

## APPENDIX B

### HEALTH AND SAFETY PLAN





# **HEALTH AND SAFETY PLAN**

## **INTERIM CORRECTIVE MEASURE**

**SOUTH LANDFILL/ CURTAIN AREA  
ATKEMIX TEN INC.  
6100 CAMPGROUND ROAD  
LOUISVILLE, KENTUCKY**

**AUGUST 2009**

**REF. NO. 008319 (30) AppB**

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## 1.0 INTRODUCTION

The Health and Safety Plan (HASP) presented herein describes the health and safety procedures and emergency response guidelines to be implemented during the completion of the Interim Corrective Measure for the South Landfill and Curtain Area at the Atkemix Ten Inc. (Site) located in Louisville, Kentucky. An Interim Corrective Measure Design which provides a detailed overview of this project is available and should be followed in conjunction with this HASP for all project-related activities. The Site Plan is provided on Figure B.2.1.

The applicability of this HASP extends to all personnel who will be on Site, including State and Federal Agency personnel, Conestoga-Rovers & Associates (CRA) employees, subcontractors, and visitors to the Site.

A vital element of CRA's Health and Safety Policies and Procedures is the implementation of a Site-specific HASP for field activities. This HASP, as applicable to this project, includes the following measures:

- Communicate the contents of this HASP to Site personnel
- Utilize the **STAR** (Stop, Think, Act, and Review) process before beginning any activity/task/job, after an incident, and/or any unusual circumstances. Stop activities to think about the task, analyze the task hazards and determine methods to reduce risk, and review the results with affected personnel. **Do not proceed unless it is safe to do so**
- Reporting and investigation of **Incidents and Near Losses**. Project personnel are responsible for promptly reporting, investigating, performing a root cause analysis, and determining appropriate corrective action(s) for ALL incidents and near losses
- Revise or develop **Job Safety Analysis (JSA)** form(s) for activities. Supervisors and affected personnel are responsible for JSA development
- Behavioral Based Safety observations using the Safe Task Evaluation Process (**STEP**)
- Completion of the **CRA Safety Coordination Review** document on an ongoing (as necessary) basis. This form serves to provide a comprehensive review and framework of project safety guidelines to assist project personnel. The form is meant to be used during pre-construction briefings, project safety audits and inspections, on-Site orientation meetings, tailgate safety meetings, and as an end-of-the-project review tool



- Eliminate unsafe conditions. Efforts must be initiated to identify conditions that can contribute to an accident and to remove exposure to these conditions
- Reduce unsafe acts. Personnel shall make a conscious effort to work safely. A high degree of safety awareness must be maintained so that safety factors involved in a task become an integral part of the task. Supervisory personnel shall ensure that personnel committing unsafe acts are held accountable through counseling, mentoring, and if necessary, reprimand
- Inspect frequently. Regular safety inspections of the work site, materials, and equipment by qualified persons ensure early detection of unsafe conditions. Safety and health deficiencies shall be corrected as soon as possible, or project activities shall be suspended. Documentation of daily inspections and corrective actions should be kept with the project files

All project-related activities at the Site will be conducted in accordance with the provisions of this approved Site-specific HASP. A copy of this HASP and employer-specific Standard Operating Procedures (SOPs) will be maintained on Site whenever activities are in progress.

## 1.1 SCOPE OF WORK

The scope of work to be completed during the project includes all or a portion of the following work activities:

- Mobilization and demobilization of labor, materials, and equipment to and from the Site
- Clearing, excavation, removal, handling/transportation, and general remediation of contaminated soil
- Construction of a landfill cover to include placement of geotextile fabric, drainage net and clean fill on sections of the remediated area
- Construction of a new drainage swale
- Removal and replacement of existing culverts with new culverts
- Placement of topsoil, seed, and mulch over designated drainage areas
- General restoration of all affected areas
- Personnel and equipment decontamination activities

During a portion of these activities, personnel may come in contact with waste materials which may contain hazardous substances. This HASP has been developed to minimize direct contact by Site personnel with materials potentially having chemical presence by ensuring:

- Site personnel are not adversely exposed to the compounds of concern
- Public health and the environment are not adversely impacted by materials with elevated chemical presence which may potentially migrate outside of the work zone during project related activities at the Site
- Compliance with applicable governmental and non-governmental (American Conference of Governmental Industrial Hygienists [ACGIH]) regulations and guidelines. In particular, the amended rules of the Occupational Safety and Health Administration (OSHA) for Part 1926 (Title 29 Code of Federal Regulations [CFR] Part 1926.65) will be implemented for all Site work
- Initiation of proper emergency response procedures to minimize the potential for any adverse impact to Site workers, the general public, or the environment

For the purpose of this HASP, activities performed on Site involving contact with materials with potentially elevated chemical presence will be considered contaminated operations requiring Personal Protective Equipment (PPE). A detailed description of the PPE required is presented in Section 6.1.

## 1.2 PROJECT ORGANIZATION

### Project Manager

The Project Manager (PM) will provide support to the project with respect to all operations on this project. The PM shall be responsible for the overall implementation of the HASP, and for ensuring that all health and safety responsibilities are carried out in conjunction with this project. This shall include, but is not limited to, review and approval of the HASP; qualifying/directing subcontractors relative to safety and health performance; coordinating all safety and health submittals; and providing the appropriate technical information to write submittals. The PM will also be responsible for scheduling and obtaining the necessary safety training for Site personnel who will be working on the Site.



### Site Safety and Health Officer

The Site Safety and Health Officer (SHO) is the person who, under the supervision of the PM and the Regional Safety and Health Manager, is responsible for the communication of Site requirements to Site project personnel and subcontractors, and for carrying out the health and safety responsibilities by making sure that:

- All necessary cleanup and maintenance of safety equipment is conducted by project personnel
- All CRA and CRA subcontractor personnel arriving at the Site will be approved by the SHO
- A daily safety diary/logbook is maintained
- Daily log of on-Site personnel is to be kept using daily sign-in sheets
- Emergency services are contacted
- Hazardous Communication (HAZCOM) program is maintained on Site
- Forms attached to the HASP are completed, filed, and submitted correctly
- A pre-entry briefing is conducted, which will serve to familiarize on-Site personnel with the procedures, requirements, and provisions of this HASP
- All necessary records are maintained in the project files (i.e., air sampling and monitoring results, calibration log sheets, incident reports, daily toolbox meeting log sheets, daily safety logbook entries, etc.)
- Daily safety meetings are held and documented by SHO

The SHO will have prior experience in working at hazardous waste sites. The SHO also has the responsibility of enforcing safe work practices for project employees. The SHO oversees the safety of any visitors who enter the Site. The SHO maintains communication with the Field Engineer and Site Superintendent.

Other specific duties of the SHO include:

- Orders the immediate shutdown of Site activities in the case of a medical emergency, unsafe condition, or unsafe practice
- Submission of Daily Safety and Health Reports which include data on work area and personnel air monitoring/sampling as part of the Daily QC Report
- Designate work areas and define minimum PPE requirements
- Provide the safety equipment, PPE, and other items necessary for CRA employees
- Enforce the use of required safety equipment, PPE, and other items necessary for CRA employee or community safety

- Conduct Site inspections as a part of quality assurance for safety and health
- Report safety and health concerns to CRA management as necessary

#### Emergency Coordinator

The SHO or his or her designee will act as the Emergency Coordinator (EC). The EC is able to implement the emergency procedures and is responsible for the following in the event of an emergency:

- The EC or his designee shall immediately respond to all imminent or actual emergency situations. The EC shall notify all personnel and emergency response agencies, identify the problem, assess the health or environmental hazards, and take all reasonable measures to stabilize the situation
- The EC must take all reasonable measures necessary to ensure that fire, explosion, emission or discharge does not occur, reoccur, or spread. These measures may include stopping operations, collecting and containing released materials, and/or removing or isolating containers
- The EC shall develop an Emergency Response Evacuation Route and communicate it to all Site personnel
- The EC shall also be responsible for follow-up activities after the incident such as cleanup of the affected area, maintenance and decontamination of the emergency equipment, and submission of any reports

#### Site Superintendent (SS)

Health and safety is a line management responsibility, and as such, the Site Superintendent (SS) will implement the overall on-Site direction and enforcement of the health and safety for this project. The SS will be designated as the "competent person" in accordance with OSHA regulations.

The SS also has the responsibility of enforcing safe work practices for project employees. The SS oversees the safety of visitors who enter the Site. The SS maintains communication with the Field Engineer.

The SS is the person who is responsible for communication of the Site requirements to Site project personnel and subcontractors, and for carrying out the health and safety responsibilities by making sure that:



- All necessary cleanup and maintenance of safety equipment is conducted by project personnel
- JSA forms are developed and revised accordingly. The "seed" JSAs included with this HASP are meant to be modified in the field based on real-time field conditions and situations
- Site personnel are implementing the STAR process before initiating activities
- Emergency phone numbers/services including hospital/clinic locations are verified/contacted
- Forms attached to the HASP are completed, filed, and submitted correctly
- A pre-entry briefing is conducted and documented, which will serve to familiarize on-Site personnel with the procedures, requirements, and provisions of this HASP

Other duties include overall implementation of the HASP, and ensuring all health and safety responsibilities are carried out in conjunction with this project. This includes, but is not limited to, review and approval of the HASP, communication of Site requirements to subcontractor personnel, and consultation with the client/Site representative regarding appropriate changes to the HASP.

#### Regional Safety and Health Manager

The Regional Safety and Health Manager (RSHM) is a full-time CRA employee who is trained as a safety and health professional, and serves in a consulting role to the PM and SS regarding potential safety and health issues.

#### Employee Safety Responsibility

CRA employees are responsible for their own safety as well as the safety of those around them. CRA employees shall use any equipment provided in a safe and responsible manner, as directed by their supervisor. CRA personnel will follow the policies set forth in this HASP and the CRA Safety and Health Program.

Employees are directed to take the following actions when appropriate:

- Suspend any operations which may cause an imminent health hazard to employees, subcontractors, or others
- Utilize STAR process before initiating work
- Preparation, submission, and review of Behavior Based Safety observations via usage of the STEP form. The STEP form is to be used in conjunction with the

appropriate JSA to identify positive aspects of task performance as well as to identify any deficiencies associated with the observed task

- Assist in the development/revision of JSA forms that are appropriate to their current scope of work. The "seed" JSAs included with this HASP are meant to be modified in the field based on real-time field conditions and situations
- Correct Site hazards when it is possible to do so without endangering life or health
- Use Stop Work Authority as necessary
- Inspect tools and other equipment before each use or as manufacturer and/or OSHA dictates
- Report safety and health concerns to the SHO

### Equipment Operators

All equipment operators are responsible for the safe operation of their equipment. Operators are responsible for inspecting their equipment on a daily basis to ensure safe performance. Documentation of daily inspections will be required. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected routinely throughout the project. Equipment will be taken out of service if an unsafe condition occurs.

### Subcontractors

There is the potential for subcontractors to be working on Site. The selected subcontractor(s) will be responsible for providing both an SS ("competent person") and a SHO to direct their activities and to meet all applicable OSHA Regulations. This may be the same individual if so qualified. These individuals will be responsible for ensuring that all contract specifications are met, including those related to Site health and safety. The names of these individuals will be included in the subcontractor Site-specific HASP.

All subcontractor personnel working at the Site will report to the SS and, in keeping with OSHA requirements, are required to comply with all procedures referenced in this HASP, the subcontractor HASP, and the OSHA Construction Standards as referenced in 29 CFR 1926.

Subcontractors to CRA shall prepare and implement their own Site-specific HASP for their contract work and provide all applicable Health and Safety SOPs for use by their Site personnel. The subcontractor's HASP shall meet the minimum requirements of this HASP. CRA will review the subcontractor HASP prior to subcontractor mobilization to the Site. Subcontractors will be responsible for the health and safety of their personnel, which includes following all applicable OSHA Regulations and the subcontractors'

Site-specific HASP. Subcontractors will be required to attend an initial Site briefing and subsequent safety meetings.

#### Short Service Employees (SSE)

Employees identified as CRA Short Service Employees (6 months or fewer) shall not be permitted to work without another non-short service CRA employee present. This includes CRA subcontractor personnel.

#### Authorized Visitors

Upon entry to the Site, authorized visitors shall sign in at the CRA office trailer. Authorized visitors shall be provided with all known information with respect to the Site operations and hazards, as applicable to the purpose of their visit. A pre-entry briefing will be conducted (by the SHO, SS, or PM), which will serve to familiarize visitors with the procedures, requirements, and provisions of this HASP. A CRA employee will escort authorized visitors during their time on Site.

Authorized visitors will be required to wear appropriate PPE before accessing the Site. See Section 6.0 for more information on Site Control.

### **1.3      STOP WORK AUTHORITY**

All CRA employees are empowered and expected to stop the work of co-workers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. Additionally, if there is a change to the scope of work or planned activity, then CRA and subcontractor personnel are expected to use their Stop Work Authority, if necessary, to address how these changes will affect Site safety and operations. NO repercussions will result from this action.

**The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated shall result in the removal of Site personnel from that area and reevaluation of the hazard and the levels of protection.**



## 2.0 **SITE CHARACTERIZATION AND POTENTIALLY HAZARDOUS COMPOUNDS**

Previous sampling of the Site has identified the presence of a number of potentially hazardous chemicals in the work area. Table B.2.1 lists such chemicals by name, itemizes potential exposure routes for each hazard and, where available, lists regulatory and/or published time weighted average (TWA) exposure limits/levels for each of the chemical hazards of concern. Table B.2.2 represents chemicals of concern that have exceeded KYDEP PRGs and represents the basis for selection of PPE and Air Monitoring requirements for this work phase.

### 3.0 BASIS FOR DESIGN

Regulations set forth by OSHA in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) form the basis of this HASP. Emphasis is placed on Sections 1926.65 (Hazardous Waste Operations and Emergency Response), 1910 Subpart I (Personal Protective Equipment), Subpart D (Occupational Health and Environmental Controls), and 1910 Subpart Z (Toxic and Hazardous Substances). In addition, current Threshold Limit Values (TLVs) formulated by the ACGIH have been considered in the development of the selection of PPE. Some of the specifications within this section are in addition to the OSHA regulations, and reflect the positions of the United States Environmental Protection Agency (USEPA), the National Institute for Occupational Safety and Health (NIOSH), and the United States Coast Guard (USCG) regarding safe operating procedures at hazardous waste sites.

The health and safety of the public and Site personnel and the protection of the environment will take precedence over cost and schedule considerations for all project work.

## 4.0 EMPLOYEE TRAINING

### 4.1 GENERAL

Required project personnel, as discussed in Section 1.2, must have completed hazardous waste operations-related training, as required by the OSHA Standard 29 CFR 1926.65. CRA field employees must also receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their training more than 12 months prior to the start of the project must have completed an 8-hour refresher course within the past 12 months. The SS must have completed an additional 8 hours of training for supervisors.

Additional safety training for specific tasks/activities may include safety training for fall protection, ladder safety, lockout/tagout, etc. may be required based on the scheduled scope of work. This safety training is to be conducted and documented before any task that requires additional training is initiated. It is the responsibility of the SHO and SS to ensure that personnel have the necessary training and skills prior to activity assignment.

### 4.2 BASIC 40-HOUR COURSE

The following is a list of the topics typically covered in a 40-hour training course:

- General safety procedures
- Physical hazards (fall protection, noise, heat stress, cold stress)
- Names and job descriptions of key personnel responsible for Site health and safety
- Safety, health, and other hazards typically present at hazardous waste sites
- Use, application, and limitations of PPE
- Work practices by which employees can minimize risks from hazards
- Safe use of engineering controls and equipment on Site
- Medical surveillance requirements
- Recognition of symptoms and signs, which might indicate overexposure to hazards
- Worker right-to-know (Hazard Communication OSHA 1926.59/1910.1200)
- Routes of exposure to contaminants
- Engineering controls and safe work practices
- Components of a Site HASP

- Decontamination practices for personnel and equipment
- Confined space entry procedures
- General emergency response procedures

#### 4.3 SUPERVISOR COURSE

Management and supervisors receive an additional 8 hours of training, which typically includes:

- General Site safety and health procedures
- PPE programs
- Air monitoring techniques

#### 4.4 SITE-SPECIFIC TRAINING

An initial Site-specific training session or briefing shall be conducted by the PM or SS prior to commencement of work activities. Personnel are not to initiate work activities until they have successfully completed all aspects of the Site-specific training.

During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities including information contained in Section 1.2
- Content and implementation of the HASP
- Site hazards and controls
- Site-specific hazardous procedures (e.g., excavating equipment)
- Training requirements
- PPE requirements
- Emergency information, including local emergency response team phone numbers, route to nearest hospital, incident reporting procedures, and emergency response procedures
- Instruction in the completion of required inspections and forms
- Location of safety equipment (e.g., portable eyewash, first aid kit, fire extinguishers)



The various components of the project HASP will be presented followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the Site until they have completed the Site-specific training session. Personnel successfully completing this training session shall sign the HASP Training Acknowledgement Form, which is presented in Attachment B-2-1.

#### 4.5 DAILY SAFETY MEETINGS

"Tailgate" safety meetings will take place each day prior to beginning the day's work. No work will be performed in an Exclusion Zone (EZ) before the daily safety meeting has been held. All Site personnel will attend these safety meetings conducted by the SS and/or SHO. The daily safety meeting must also be held prior to initiating new tasks, and repeated if new hazards are encountered. Attachment B-2 provides the form for documenting the daily safety meetings.

The safety meetings will cover:

- Specific health and safety issues
- Site activities
- Relevant JSAs (list JSAs reviewed on the daily safety meeting form)
- Changes in Site conditions
- A review of topics covered in the Site-specific pre-entry briefing.

#### 4.6 FIRST AID AND CPR

At least one employee current in First Aid/CPR/AED will be assigned to the work crew and will be on Site during operations. Refresher training in first aid and CPR is required to keep the certificate current. These individuals must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens. Blood-borne pathogen training is included as part of the first aid/CPR/AED training course delivered by the American Red Cross.



## 5.0 PERSONAL PROTECTIVE EQUIPMENT

This section of the HASP describes the requirements for PPE and the specific levels of protection required for each work task to be conducted at the Site during project-related activities. Basic PPE in all Site areas will consist of ANSI rated Class E hard hats, ANSI rated safety glasses, ANSI rated safety vests or reflective garment, and ANSI rated safety boots with puncture resistant soles.

The specific PPE for each task is also referenced in each JSA.

### 5.1 PROTECTION LEVELS

Personnel will wear protective equipment when project-related activities involve potential exposure to chemicals from vapors, gases, or particulates that may be generated on Site or when direct contact with potentially hazardous substances may occur. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals. Respirators protect lungs, the gastrointestinal tract, and if a full-face respirator is worn, the eyes, against airborne toxicants. Respiratory protection levels will be based on the real-time air monitoring results and corresponding action levels that are presented in Table B.6.2.

Protection levels are selected based upon the following:

- Measured concentrations of the Site chemicals and expected concentrations in the ambient atmosphere compared to allowable exposure levels (Table B.2.1)
- Potential for exposure to chemicals in air, splashes of liquids, or other contact due to the nature of work tasks
- Site chemical toxicity, route of exposure, and chemical matrix

The specific protection levels to be employed at the Site for each work task are listed in Table B.6.1 and the JSAs. All project related activities conducted at the Site will require the use of one of the following levels of PPE.

#### Level B

- Supplied air respirator (Mine Safety and Health Administration [MSHA]/NIOSH approved). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA) or positive pressure-demand airline respirator (with escape bottle

for Immediately Dangerous to Life and Health [IDLH] or potential for IDLH atmosphere)

- Polycoated Tyvek® or saranex® coveralls
- ANSI rated steel toe work boots with puncture resistant soles and disposable boot covers or ANSI steel toe rubber boots with puncture-resistant soles
- disposable nitrile inner gloves
- outer nitrile work gloves
- approved hearing protection as necessary
- ANSI rated Class E hard hat

#### Level C

- Tyvek® coveralls (polycoated Tyvek® when handling or working with liquids [e.g., decontamination])
- ANSI rated steel toe work boots with puncture-resistant soles and disposable boot covers or ANSI steel toe rubber boots with puncture-resistant soles
- Disposable nitrile inner gloves
- Outer nitrile work gloves
- Full-face air purifying respirator (APR), equipped with combination cartridges for organic vapors and particulates (P-100)
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection meeting ANSI must be used)
- ANSI rated Class E hard hat

#### Modified Level D

- Tyvek® coveralls (polycoated Tyvek® when handling or working with liquids)
- ANSI rated steel toe work boots with puncture-resistant soles and disposable boot covers or ANSI steel toe rubber boots with puncture-resistant soles
- Disposable nitrile inner gloves
- Outer nitrile work gloves
- ANSI rated safety glasses
- ANSI rated safety vest or reflective garment

- Hearing protection (if noise levels exceed 85 dBA, then hearing protection meeting ANSI must be used)
- ANSI rated Class E hard hat

#### Level D

- Standard work uniform or coveralls
- ANSI rated steel toe work boots with puncture resistant soles
- Gloves as necessary (task dependent)
- ANSI rated safety glasses
- ANSI rated safety vest or reflective garment
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection meeting ANSI must be used)
- ANSI rated Class E hard hat

PPE will be maintained in a clean sanitary condition and ready for use. Disposable coveralls shall be discarded when torn and as an employee leaves the EZ. Hard hats shall be thoroughly cleaned after leaving the EZ. Respirators shall be cleaned after each day's use and cartridges discarded. A sufficient quantity of potable water shall be supplied for the washing and cleaning PPE as well as drinking. A potable water supply for washing and cleaning PPE will be maintained adjacent to the decontamination area described in Section 9.0. Fresh potable water for drinking will be supplied on a daily basis and be maintained at a location removed from the active work area.

## 5.2 REASSESSMENT OF PROTECTION LEVELS

Protection levels provided by PPE selection shall be upgraded or downgraded based upon a change in Site conditions or the review of the results of air monitoring and initial exposure assessment monitoring program.

When a significant change occurs, the hazards shall be reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase
- Change in job tasks during a work phase
- Change of season/weather



- When temperature extremes or individual medical considerations limit the effectiveness of PPE
- Chemicals other than those expected to be encountered are identified
- Change in ambient levels of chemicals
- Change in work scope which effects the degree of contact with areas of potentially elevated chemical presence.

All proposed changes to protection levels and PPE requirements will be reviewed and approved prior to their implementation by the Health and Safety Officer.

### 5.3 RESPIRATORY PROTECTION

Respiratory protection is an integral part of employee health and safety at sites with potential airborne contamination.

#### 5.3.1 SITE RESPIRATORY PROTECTION PROGRAM

The Site respiratory protection program will consist of the following:

- All Site personnel who may use respiratory protection will have an assigned respirator
- All Site personnel who may use respiratory protection will have been fit tested and trained in the use of a full-facepiece APR within the past 12 months
- All Site personnel who may use respiratory protection must, within the past year, have been medically certified as being capable of wearing a full face respirator with combination cartridges. Documentation of the medical certification must be provided to the SHO prior to commencement of Site work. Further discussed in Section 12.0.
- Only cleaned, maintained, NIOSH-approved respirators are to be used on this Site
- If respirators are used, the respirator cartridge is to be properly disposed of at the end of each work shift or upon chemical breakthrough
- Contact lenses may be worn with a full-face respirator, if employee does not wear contacts, but needs corrected vision a spectacle kit will be provided

- All Site personnel who may use respiratory protection must be clean shaven. Mustaches and sideburns are permitted, but they must not interfere with the sealing surface of the respirator
- Respirators will be inspected and a negative pressure test performed prior to each use
- After each use, the respirator will be wiped with a disinfectant, cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location, in a manner that will not distort the facepiece

Respiratory protection may be required during some of the activities. This is to ensure worker protection from potentially contaminated particulates impacted with semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs). It is expected that Modified Level D personal protection will be worn during the majority of field activities involving the handling of impacted materials. However, the SHO will make the determination of the acceptable level of protection based upon the results of the air monitoring program. Also, if during these field activities the real-time air monitoring program indicates the need for an upgrade in protection to Level C or Level B, then these activities will be continued with the increased level of personal protection and additional source controls (i.e., foam, plastic sheeting, soil cover, water spray, etc.) will be implemented to control vapors and/or particulates.

Action levels to determine the level of respiratory protection necessary for organic vapors are based on the concentration of Site contaminants measured within the breathing zone. The action levels and appropriate respiratory protection are referenced in Table B.6.2. The action levels have been set based on the presence of known particulates and VOCs as the main contaminants of concern. However, if the ambient concentrations of organic vapors/particulates are due to unidentifiable/ unknown substances, the level of respiratory protection may be altered by the SHO. The air monitoring equipment selected for this project can be found in Section 8.0.

The appropriate air purifying respirator cartridge to be used at the Site is a combination organic vapor and P-100 cartridge (MSA GME P100). The cartridge must be of the same manufacturer as the respirator face piece.



## 5.4 USING PPE

Depending upon the level of protection selected for this project, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Level B or Level C PPE is used.

All personnel entering the EZ must put on the required PPE in accordance with the requirements of this HASP. When leaving the EZ, PPE will be removed in accordance with the procedures listed to minimize the spread of contamination.

### 5.4.1 DONNING PROCEDURES

These procedures are mandatory only if Level B or Level C PPE is used on the project:

- Remove bulky outerwear. Remove street clothes and store in clean location
- Put on work clothes or coveralls
- Put on the required chemical protective coveralls or rain gear
- Put on the required chemical protective boots or boot covers
- Tape the legs of the coveralls to the boots with duct tape
- Put on the required chemical protective gloves
- Tape the wrists of the protective coveralls to the gloves
- Don the required respirator and perform appropriate fit check
- Put hood or head covering over head and respirator straps and tape hood to facepiece
- Don remaining PPE, such as hard hat

When these procedures are instituted, one person must remain outside the work area to ensure that each person entering has the proper protective equipment.

### 5.4.2 DOFFING PROCEDURES

The following procedures are mandatory only if Level B or C PPE is required for this project. Whenever a person leaves a Level B or C work site, the following decontamination sequence will be followed:

- Upon entering the Contamination Reduction Zone (CRZ), rinse contaminated materials from the boots or remove contaminated boot covers
- Clean reusable protective equipment
- Remove protective garments, equipment, and respirator. All disposable clothing should be placed in a covered container, which is labeled
- Wash hands, face, and neck, or shower (if necessary)
- Proceed to clean area and dress in clean clothing
- Clean and disinfect respirator for next use

All disposable equipment, garments, and PPE must be placed in covered containers and labeled for disposal. See Section 10.0 for detailed information on decontamination procedures.

## 5.5 SELECTION MATRIX

The level of personal protection selected will be based upon real-time air monitoring of the work environment and an assessment by the SS and SHO of the potential for skin contact with contaminated materials. The PPE selection matrix is given in the JSA tables located in Attachment B-4. This matrix is based upon information available at the time this plan was written. The exposure levels presented in Table B.2.1 should be used to verify that the PPE prescribed is appropriate.

## 5.6 DURATION OF WORK TASKS

The duration of project-related activities involving the usage of PPE will be established by the Health and Safety Officer based upon ambient temperature and weather conditions, the capacity of personnel to work in the designated level of PPE (heat stress and cold stress, see Section 7.12), and limitations of the protective equipment (i.e., ensemble permeation rates, life expectancy of air-purifying respirator cartridges, etc.). As a minimum, rest breaks will be observed at the following intervals:

- 15 minutes midway between shift startup and lunch
- ½ hour for lunch
- 15 minutes in the afternoon, between lunch and shift end

All rest breaks will be taken in a clean area (e.g., support zone) after full decontamination and PPE removal. Additional rest breaks will be observed based upon the heat stress monitoring guidelines presented in the CRA Health and Safety SOPs.

## 5.7 LIMITATIONS OF PROTECTIVE CLOTHING

PPE ensembles have been selected to provide protection against contaminants at anticipated concentrations. However, no protective garment, glove, or boot is chemical-proof, nor will it afford protection against all chemical types. Permeation of a given chemical through PPE is a complex process governed by contaminant concentrations, environmental conditions, physical condition of the protection garment, and the resistance of a garment to a specific contaminant; chemical permeation may continue even after the source of contamination has been removed from the garment.

In order to obtain optimum usage from PPE, the following procedures are to be followed by all Site personnel using PPE:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- Inspect all clothing, gloves, and boots both prior to and during use for:
  - Imperfect seams
  - Non-uniform coatings
  - Tears
  - Poorly functioning closures
- Inspect reusable garments, boots, and gloves both prior to and during use for:
  - Visible signs of chemical permeation
  - Swelling
  - Discoloration
  - Stiffness
  - Brittleness
  - Cracks
  - Any sign of puncture
  - Any sign of abrasion



Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above will be discarded. PPE used in areas known or suspected to exhibit elevated concentrations of contaminants will not be reused.

Site personnel also carry certain responsibilities for their own health and safety, and are required to observe the following safe work practices:

- Familiarize themselves with this HASP
- Use the "buddy system" when working in a contaminated operation
- Use the safety equipment in accordance with training received, labeling instructions, and common sense
- Maintain safety equipment in good condition and proper working order
- Refrain from activities that would create additional hazards (i.e., smoking, eating, etc., in restricted areas, leaning against dirty, contaminated surfaces)
- Smoking, eating, and drinking will be prohibited except in designated areas. These designated areas may change during the duration of the project to maintain adequate separation from the active work area(s). Designation of these areas will be the responsibility of the SHO
- Soiled disposable outerwear shall be removed and placed into a covered container prior to washing hands and face, eating, using lavatory facilities, or leaving the Site

## 6.0 SITE CONTROL

### 6.1 AUTHORIZATION TO ENTER

All personnel working in EZs must have completed hazardous waste operations initial training as defined under OSHA Regulation 29 CFR 1926.65, have completed their training or refresher training within the past 12 months, and have been certified by a physician as fit for hazardous waste operations in order to enter a Site area designated as an EZ or CRZ. Personnel without such training or medical certification may enter the designated SZ only. The SHO will maintain a list of authorized persons; only personnel on the authorized persons list will be allowed within the EZ or CRZ.

The CRA SHO has been designated to coordinate access control and on-Site security. A safe perimeter (support zone) has been established at the boundaries of the Site (see Figure B.6.1. An on-Site control point has been established at the flood control levee. This point will be used to restrict or otherwise control Site access.

### 6.2 SITE ORIENTATION AND HAZARD BRIEFING

No person will be allowed in the general work area during Site operations without first being given a Site orientation and hazard briefing. This orientation will be presented by the SHO and will consist of a review of this HASP. This review must cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. Attachment B-2-1 provides a Training Acknowledgment Form for documentation purposes. In addition to this meeting, daily safety meetings will be held each day before work begins. All people on the Site, including visitors, must document their attendance to this briefing as well as the daily safety meetings on the forms included with this HASP. Attachment B-2 presents the Daily Safety Meeting Log.

### 6.3 CERTIFICATION DOCUMENTS

A training and medical file will be established for the project and kept on Site during all Site operations. The 40-hour training, update, and respirator fit test certificates, as well as current medical clearance for all project field personnel will be maintained within that file. Subcontractor personnel must provide a copy of their training, respirator fit test, and medical documentation to the CRA SHO prior to the start of fieldwork. Additional



safety training certification documents (fall protection, confined space, aerial lift/scaffold, etc.) may be necessary based on the scheduled task activity.

#### 6.4 ENTRY LOG

A log-in/log-out sheet must be maintained at the Site by the SHO. Personnel may sign in and out on a log sheet as they enter and leave the CRZ, or the SHO may document entry and exit in the field notebook (for truck drivers/deliveries).

#### 6.5 ENTRY REQUIREMENTS

In addition to the authorization, hazard briefing, and certification requirements listed above, no person will be allowed to enter the Site unless wearing the minimum SZ PPE as described in Section 5.0 and Table B.6.1. Personnel entering the EZ or CRZ must wear the required PPE for those locations.

#### 6.6 EMERGENCY ENTRY AND EXIT

People who must enter the Site on an emergency basis will be briefed of the hazards by the SHO. All hazardous activities will cease in the event of an emergency and any sources of emissions will be controlled, if possible.

People exiting the Site because of an emergency will gather in a safe area for a head count. The SHO is responsible for ensuring that all people who entered the work area have exited in the event of an emergency. The Emergency Meeting Point will be at the Site access point on the plant side of the flood control levee, as identified on Figure B.6.1.

#### 6.7 CONTAMINATION CONTROL ZONES

Contamination control zones are maintained to prevent the spread of contamination and to prevent unauthorized people from entering hazardous areas. Control boundaries have been established and the zones have been identified and designated.

### 6.7.1 EXCLUSION ZONE (EZ)

Exclusion zones as identified on Figure B.2.1 indicate areas consisting of activities including excavation areas, waste staging areas, and spreading areas. These areas will be included in the EZ and will be identified and restricted with barrier fencing. These areas will be under the control of the SHO when remedial activities are occurring. "DANGER: Soil Remediation in Progress – Do Not Enter" signs will be placed on fencing to the EZ. A secondary EZ may be characterized within these boundaries based on exposure characterizations performed during the project.

The EZ consists of the specific work area, or may be the entire area of suspected contamination. All employees entering the EZ must use the required PPE, and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. The location of each EZ will be identified by cones, caution tape, or other appropriate means.

### 6.7.2 CONTAMINATION REDUCTION ZONE (CRZ)

The CRZ or transition area will be established, if necessary, to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on Site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the SZ.

### 6.7.3 SUPPORT ZONE (SZ)

The SZ is a clean area outside the CRZ located to prevent employee exposure to hazardous substances. Eating and drinking will be permitted in the SZ only after proper decontamination. Smoking will only be permitted in the SZ.

The Site will be restricted with barrier fencing to preclude any current recreational uses during the timeframe remedial activities are occurring.

## 7.0 ACTIVITY HAZARD/RISK ANALYSIS

This section identifies and evaluates the potential chemical, physical, and biological hazards, which may be encountered while conducting Site activities. Specific activity JSA sheets (see Attachment B-2) have been developed to address the hazards associated with scheduled/known Site activities, which are outlined in Section 1.1 of this HASP. These forms are to be modified in the field based on real-time conditions.

Note: If a non-routine task or previously unidentified task becomes necessary, then a job safety analysis that addresses the new task must be developed and implemented before initiating the new activity.

In addition to the chemical hazards presented in Section 2.0 of this HASP, physical and biological hazards including: potential heat and cold stress; hazards presented by the use of heavy equipment; underground/overhead utility hazards; hazards presented by confined spaces and excavations/trenches; biological hazards including snakes, poison ivy, poison oak, mosquitoes, bees, and wasps; uneven terrain and slippery surfaces; water; and the use of decontamination equipment exist at the Site. It will be the responsibility of the SHO and Site personnel to identify the physical and/or biological hazards posed by the various Site construction activities and implement preventative and corrective action.

Additional general safety practices to be implemented are as follows:

- At least one copy of this HASP must be at the project Site, in a location readily available to all personnel, and reviewed by all project personnel prior to starting work
- All Site personnel must use the buddy system (working in pairs or teams)
- Food, beverages, or tobacco products must not be present or consumed in the EZ and CRZ. Cosmetics must not be applied within these zones
- Emergency equipment such as eyewash, fire extinguishers, etc., must be removed from storage areas and staged in readily accessible locations
- Contaminated waste, debris, and clothing must be properly contained and legible and understandable precautionary labels must be affixed to the containers
- Removing contaminated soil from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited



- Containers must be moved only with the proper equipment, and must be secured to prevent dropping or loss of control during transport
- Visitors to the Site must be instructed to stay outside the EZ and CRZ and remain within the SZ during the extent of their stay. Visitors must be cautioned to avoid skin contact with surfaces, which are contaminated or suspected to be contaminated.

## 7.1 CHEMICAL EXPOSURE

Preventing exposure to toxic chemicals is a primary concern. Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage at the point of contact or can act systematically, causing a toxic effect at a part of the body distant from the point of initial contact. The potential chemicals of concern at the Site are listed in Table B.2.1.

Chemical exposures are generally divided into two categories: acute and chronic. Symptoms resulting from acute exposures usually occur during or shortly after exposure to a sufficiently high concentration of a contaminant. The concentration required to produce such effects varies widely from chemical to chemical. The term "chronic exposure" generally refers to exposures to "low" concentrations of a contaminant over a long period of time. The "low" concentrations required to produce symptoms of chronic exposure depend upon the chemical, the duration of each exposure, and the number of exposures. For a given contaminant, the symptoms of an acute exposure may be completely different from those resulting from chronic exposure.

For either chronic or acute exposure, the toxic effect may be temporary and reversible, or may be permanent (disability or death). Some chemicals may cause obvious symptoms such as burning, coughing, nausea, tearing eyes, or rashes. Other chemicals may cause health damage without any such warning signs (this is a particular concern for chronic exposures to low concentrations). Health effects such as cancer or respiratory disease may not become evident for several years or decades after exposure. In addition, some toxic chemicals may be colorless and/or odorless, may dull the sense of smell, or may not produce any immediate or obvious physiological sensations. Thus, a worker's senses or feelings cannot be relied upon in all cases to warn of potential toxic exposure.

The effects of exposure not only depend on the chemical, its concentration, route of entry, and duration of exposure, but may also be influenced by personal factors such as the individual's smoking habits, alcohol consumption, medication use, nutrition, age, and sex.

An important exposure route of concern at the Site is inhalation. The lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be colorless, odorless, and their toxic effects may not produce any immediate symptoms). Respiratory protection is therefore extremely important if there is a possibility that the work site atmosphere may contain such hazardous substances. Chemicals can also enter the respiratory tract through punctured eardrums. Where this is a hazard, individuals with punctured eardrums should be medically evaluated specifically to determine if such a condition would place them at an unacceptable risk and preclude their working at the task in question.

Direct contact of the skin and eyes by hazardous substances is another important route of exposure. Some chemicals directly injure the skin. Some pass through the skin into the bloodstream where they are transported to vulnerable organs. Skin absorption is enhanced by abrasions, cuts, heat, and moisture. The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye). Wearing protective equipment, not using contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface), keeping hands away from the face, and minimizing contact with liquid and solid chemicals can help protect against skin and eye contact.

Although ingestion should be the least significant route of exposure at the Site, it is important to be aware of how this type of exposure can occur. Deliberate ingestion of chemicals is unlikely, however, personal habits such as chewing gum or tobacco, drinking, eating, smoking cigarettes, and applying cosmetics at the Site may provide a route of entry for chemicals.

The last primary route of chemical exposure is injection, whereby chemicals are introduced into the body through puncture wounds (i.e., by stepping or tripping and falling onto contaminated sharp objects). Wearing safety shoes, avoiding physical hazards, and taking common sense precautions are important protective measures against injection.



## 7.2 CHEMICAL HAZARD CONTROLS

Airborne exposure or contact with the Site chemicals shall be controlled by:

- Skin contact with chemicals may be controlled by use of the proper PPE, personal hygiene, and good housekeeping procedures. The proper PPE (e.g., polycoated Tyvek® gloves) as described in Section 5.0 of this HASP shall be worn for all activities where contact with potentially harmful media or materials is anticipated
- Monitoring air concentrations for volatile organic chemicals shall be conducted in the breathing zone with a PID with a 11.7 eV lamp or greater, as discussed in Section 8.0
- Monitoring air concentrations for dust particles shall be conducted during intrusive activities with a dust monitor
- Using respiratory protection as appropriate, in areas known to have concentrations above the specified action level for each chemical

## 7.3 HAZARD COMMUNICATION

Personnel required to handle or use hazardous materials as part of their job duties will be trained and educated in accordance with the Hazard Communication standard. The training shall include instruction on the safe usage and handling procedures of hazardous materials, how to read and access Material Safety Data Sheets (MSDSs), and the proper labeling requirements.

The MSDSs for those chemicals in use at the Site will be available to project personnel. The SHO will be responsible for maintaining the MSDSs.

## 7.4 BUDDY SYSTEM

All on-Site personnel must use the buddy system. Visual contact must be maintained between crewmembers at all times, and crewmembers must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration
- Changes in coordination

- Excessive salivation and pupillary response
- Changes in speech pattern

Team members must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Employees must inform their partners or fellow team members of non-visible effects of exposure to toxic materials. The symptoms of such exposure may include:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract

If PPE or noise levels impair communications, pre-arranged hand signals must be used for communication. Personnel must stay within line of sight of another team member. The following hand signals will be used by downrange field teams in conjunction with the "buddy" system. These signals are very important when working with heavy equipment. They shall be known by the entire field team before operations commence.

<i>Signal</i>	<i>Meaning</i>
Hand Gripping Throat	Out of Air; Can't Breathe
Grip Partner's Wrist	Leave Area Immediately
Hands on Top of Head	Need Assistance
Thumbs Up	Ok, I'm All Right, I Understand
Thumbs Down	No, Negative

## 7.5 HEAVY EQUIPMENT

The following practices shall be adhered to by personnel operating heavy equipment (such as backhoes) and personnel working in the vicinity of heavy equipment:

- Heavy equipment is to be inspected when equipment is initially mobilized/delivered to a work site or after it is repaired and returned to service to ensure that it meets all manufacturer and OSHA specifications (e.g., fire extinguishers, backup alarms, etc.)
- The swing radius of heavy equipment will be demarcated by signage and/or safety zone control devices depending on the type of heavy equipment
- Heavy equipment is to be inspected on a daily basis. Documentation of this daily pre-operational inspection is to be filed with the project files
- Heavy equipment is only to be operated by authorized, competent operators
- Seat belts are to be provided on heavy equipment that is not designed for stand-up operation
- Equipment/vehicles whose payload is loaded by crane, excavator, loader, etc. will have a cab shield and/or canopy to protect the operator
- Personnel will not be raised/lowered in buckets
- Personnel will not ride on fender steps or any place outside the cab
- Before leaving the equipment controls, ensure that the equipment is in its safe resting position. For a backhoe, apply the parking brake, put the front loader bucket down on the ground level, and ensure that the rear excavator bucket is locked in the travel position. Bulldozers and scraper blades, loader buckets, dump bodies, and similar equipment will be fully lowered or blocked when not in use
- Before raising any booms, buckets, etc., check for overhead obstructions
- Employees involved in the operation shall not wear any loose-fitting clothing, which has the potential to be caught in moving machinery
- Personnel shall wear high visibility safety vests, steel-toed shoes, safety glasses, hearing protection, and hard hats during heavy equipment operations
- Personnel shall not enter the swing radius of heavy equipment unless the operator is aware of their presence and the machine has been taken to a zero-energy state
- When moving heavy equipment or when working in tight quarters, a spotter should be used

## 7.6 EARTHWORK - EXCAVATION AND TRENCHING

Site activities will involve excavation, soil consolidation and capping of impacted material as shown on Figure B.3.1. It is the responsibility of the SHO and/or SS to



implement the following components of the CRA Excavation and Trenching Safety Program as they relate to project activities:

- That all excavations are completed in accordance with the CRA Excavation and Trenching Safety Program or an approved subcontractor's excavation program
- That the proper protective materials and equipment are available to complete the excavation and/or trenching procedures
- Ensure the necessary inspections of the excavation are completed as required
- Submit any subcontractor's Excavation and Trenching Safety Programs to CRA's RSHM for review prior to initiating excavation activities.

Excavation and trenching operations require pre-planning to determine whether sloping or shoring systems are required, and to develop appropriate designs for such systems. Also, the estimated location of all underground installations must be determined before digging begins.

If there are any nearby buildings, walls, sidewalks, trees, or roads that may be threatened or undermined by the excavation, where the stability of any of these items may be endangered by the excavation, they must be removed or supported by adequate shoring, bracing, or underpinning.

Excavations may not go below the base of footings, foundations, or retaining walls, unless they are adequately supported or a person who is registered as a Professional Engineer (PE) has determined that they will not be affected by the soil removal. OSHA recommends using civil engineers or those with licenses in a related discipline and experience in the design and use of sloping and shoring systems. PE qualifications must be documented in writing.

#### Access and Egress

Personnel access and egress from trench and/or excavations are as follows:

- A stairway, ladder, ramp, or other means of egress must be provided in trenches greater than 4 feet deep and for every 25 feet of lateral travel
- All ladders shall extend 3 feet above the top of the excavation
- Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design or by a licensed professional engineer



### Atmosphere Monitoring and Testing

Air quality is measured using three parameters: oxygen concentration, flammability, and the presence of hazardous substances.

Employees should not be exposed to atmospheres containing less than 19.5 percent oxygen or having a lower flammable limit greater than 10 percent, and employees should not be exposed to hazardous levels of atmospheric contaminants.

Whenever potentially hazardous atmospheres are suspected in excavations and trenches, the atmosphere shall be tested by a competent person. Detector tubes, gas monitors, and explosion meters are examples of monitoring equipment that may be used.

In the event that an unusual odor or liquid is suspected in excavations and trenches, the competent person shall stop work on the Site and arrange for air quality assessment and mitigation, if necessary.

Atmospheric testing and monitoring shall be performed in excavations in or adjacent to landfill areas, in areas where hazardous materials are/were stored, or in areas where the presence of hazardous materials is suspected.

### Daily Inspections

The competent person shall perform daily inspections of excavations, the adjacent areas, and all protective systems for situations that could potentially result in slope failure.

Additionally, the competent person shall be aware of the potential for confined space situations and other hazardous work conditions.

The competent person shall inspect, evaluate, and complete the excavation checklist at the following intervals:

- Prior to the start of work, after each extended halt in work, and as needed throughout the shift as new sections of the excavation or trench are opened
- After every rainstorm and other natural or man-made event that may increase the load on the walls of the excavation, or otherwise affect their stability

The inspections shall be documented using the CRA Excavation Inspection Checklist attached to this HASP.

The CRA Excavation and Trenching Safety Program and the OSHA Excavation Standard (29 CFR 1926 Subpart P) will be followed during all excavation activities and provide detailed information regarding such activities.

## **7.7      ALL-TERRAIN AND UTILITY TASK VEHICLE (UTV) OPERATIONS**

This procedure provides the minimum requirements for safe work practices during the operation of all-terrain vehicles (ATVs) and utility task vehicles (UTVs) (i.e., Kawasaki Mule, Yamaha Rhino, John Deere Gator, etc.) as these vehicles are specifically designed for off-road use only. These vehicles operate and maneuver differently than a passenger vehicle (e.g., car, truck) when driving on uneven terrain and or in muddy, rocky, and heavily vegetated areas. Personnel having to use such vehicles require proper instruction and training on the units prior to operation. Personnel will be familiar with the operations and maintenance of the units accordingly to the manufacturer's Owner's Manual.

Prior to operating these vehicles, authorized personnel will complete a daily pre-ride inspection (Attachment B-5). Remove all debris (e.g., mud, weeds) from moving components and perform housekeeping in and around the cab area. Each vehicle shall be equipped with a minimum of a 2.5-pound ABC rated fire extinguisher and a high visibility flag that is set in a vertical position and extends at least 3 feet above the canopy or roll bar.

All authorized personnel shall operate such vehicles in a safe and responsible manner accordingly to the Owner's Manual. Excessive speeding or horseplay will not be tolerated when operating these vehicles. Based on certain models and types of vehicles, seat belts are provided and must be worn by the operator and passenger at all times. These types of vehicles (model) are susceptible to tipping/rolling over when operations are being conducted on steep inclines. Avoid operating across bodies of water (e.g., rivers, creeks) until depth of water has been verified and confirmed by the operator.

Transporting of materials/supplies when using utility task vehicles should be loaded uniformly for weight distribution and secured. Refer to the Owner's Manual for maximum load capacities.

## 7.8 UTILITIES

Elevated superstructures (e.g., backhoes, scaffolding, ladders, cranes) shall remain a distance of 10 feet away from utility lines (<50 kV) and 20 feet away from power lines (>50 kV). Underground utilities, if present, shall be clearly marked and identified prior to commencement of work. Follow local/state/provincial regulations with regards to utility locating requirements (e.g., One-Call, etc.).

Personnel involved in intrusive work shall:

- Review and adhere to CRA's Subsurface Utility Clearance Protocol
- Utilize the Property Access/Utility Clearance Data Sheet (QSF-019)
- Be able to determine the minimum distance from marked utilities which work can be conducted with the assistance of the locator line service

## 7.9 NOISE

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on Site. The CRA Hearing Conservation Program will be implemented for affected CRA employees.

Control: All personnel must wear hearing protection with a Noise Reduction Rating (NRR) of at least 20 when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All Site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.



## 7.10 SLIP/TRIP/HIT/FALL INJURIES

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot check the work area to identify hazards
- Establish and utilize a pathway which is free of slip and trip hazards
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain
- Carry only loads which you can see over
- Keep work areas clean and free of clutter, especially in storage rooms and walkways
- Communicate hazards to Site personnel

## 7.11 CONFINED SPACE ENTRY

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, oxygen deficient atmospheres, limited visibility, and restricted movement. This section establishes requirements for safe entry into, continued work in, and safe exit from confined spaces. Additional information regarding confined space entry can be found in 29 CFR 1926.21, and 29 CFR 1910.146.

Entry into a confined space will only be undertaken after remote methods have been tried and found not to be successful. Confined space entries are not anticipated. However, if confined space entry is required, such work will only be undertaken following the guidelines presented in the CRA Health and Safety SOPs.

## 7.12 MATERIAL HANDLING

Material handling operations to be conducted at the project Site include manual lifting of materials to and from trucks and the setup/maintenance of storage areas.

### 7.12.1 MANUAL MATERIAL HANDLING

It is the policy of CRA that manual lifting of loads shall be avoided whenever possible. Instead, use equipment such as hoists, carts, and forklifts to assist personnel. However,



if manual lifting must take place, the safe work practices referenced in this section shall be followed. Lifting too much weight or using incorrect lifting procedures causes more than 50 percent of all lost-time back injuries. Therefore CRA has set a maximum personal weight limit of 50 pounds and requires that all personnel involved in manual material handling activities shall receive training in lifting techniques and back safety.

If there is a discrepancy between this policy and the client, Site, and or subcontractor requirements, then the difference will be resolved by the CRA PM and client or subcontractor PM with technical input from the CRA Corporate Safety and Health Manager (or designee). These individuals will develop a variance to this policy. This information will be contained in the project health and safety plan and its associated JSA forms.

Specific lifting procedures that should be followed whether on the job or at home are as follows:

- Plan your move. Ensure that your path of travel is free of obstructions including slip/trip/fall hazards
- Inspect the load – look for any sharp edges, slivers, or other hazards that could cause injury
- Always push on a load/object as pushing will put less strain on your body and offers some protection should the object tip over
- Feet must be parted (use a wide balanced stance), with one foot alongside the object being lifted and one foot slightly behind. When the feet are comfortably spread, a more stable lift can occur and the rear foot is in a better position for the upward thrust of the lift
- Use the squat position and keep the back straight - but remember that straight does not mean vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the gut that can cause a hernia
- Tighten your stomach muscles. Inhale prior to the lift and exhale at the top of the lift
- Grip is one of the most important elements of correct lifting. The fingers and the hand are extended around the object to be lifted - using the full palm. Fingers have very little power - use the strength of your entire hand and keep the load balanced. Use handles or select appropriate gloves to increase quality of grip
- The load must be drawn close to the body, and the arms and elbows tucked into the side of the body. Holding the arms away from the body increases the strain on the

arms and elbows. Keeping the arms tucked in helps keep the body weight centered. One must consider the shape of the load here as the shape of the load may make it difficult to get the center of load close to the body. The further the center of the load is from the body the more stress that will be placed on the body

- The body must be positioned so that the weight of the body is centered over the feet. This provides a more powerful line of thrust and also ensures better balance. Start the lift with a thrust of the rear foot
- Do not twist or bend the back/spine. Pick up your feet and pivot to turn
- Lower the load slowly and in full control using the procedures indicated above
- For two-person lifts, the lifters should be similar in height and address the overall lifting process in the JSA prior to the lift. Contact a CRA safety professional or your Regional Safety and Health Manager for more information on two-person lifting practices

It is recommended to keep your body conditioned and to know and comply with your personal limitations. Remember the following phrase: lifting is a breeze when you bend at the knees.

#### 7.12.2 GENERAL STORAGE PRACTICES

The basic safety requirement for storage areas is that the storage of materials and supplies shall not create a hazard. Additional general storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers shall be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse
- All stacked materials, cargo, etc. shall be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects should be corrected as they are detected
- Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest haborage
- Storage areas shall have provisions to minimize manual lifting and carrying. Aisles and passageways shall provide for the movement of mechanical lifting and conveyance devices



- Stored materials shall not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes
- "NO SMOKING" signs shall be conspicuously posted, as needed, in areas where combustible or flammable materials are stored and handled
- Cylindrical materials such as pipes and poles shall be stored in racks, or stacked on the ground and blocked

### 7.13 BIOLOGICAL HAZARDS

CRA employees conduct numerous project activities that have the possibility of encountering biological hazards, which include bloodborne pathogens, insects, spiders, scorpions, rodents, snakes, and large predators. This section identifies precautions to be taken if these hazards are encountered.

#### 7.13.1 VEGETATION OVERGROWTH

Overgrown weeds, bushes, trees, grass, and other vegetation are fire and safety hazards. There are a number of hidden hazards not immediately recognized due to the overgrowth of vegetation in areas where field activities may occur, including discarded junk, litter, and debris. Construction materials such as boards, nails, concrete, and other debris may be hidden beneath blades of tall grass, weeds, and bushes. Other hazards may include steep slopes, potholes, trenches, soft spots, dips, etc.; all dangerously concealed from the view of the individual walking or operating motorized equipment in the area. Additionally, there are biological hazards such as snakes, ticks, chiggers, and mosquitoes that breed in overgrowth conditions.

Here are some simple actions you can take:

- Assess the work area and determine if the area requires vegetation clearance. Consider that overgrowth that extends above the lowest level of motorized equipment (i.e., bumper or fender) or 6 inches (15 cm) above your ankle has hidden hazards that you will not be able to readily identify
- Determine if the area is safe to walk or whether you need motorized equipment. Consider the limitations of the equipment

- Identify slip, trip, and fall hazards and remove from the general work area. Remember to give adequate clearance so that the items being removed do not pose future hazards
- Adequately protect yourself against the hazards by wearing boots that protect the ankles, long pants, and using insecticides
- Consider the limitations of manual or mechanical equipment for the clearance of overgrowth, particularly the safety hazards when using sling blades, machetes, weed eaters, bush hogs, or other brush removing equipment

Before taking any action, determine whether there any ecological issues that would affect or prevent the removal of overgrowth in protected areas such as wetlands, wildlife habitats, or sanctuaries for endangered and/or protected species.

### 7.13.2 POISONOUS PLANTS

Common **Poison Ivy** grows as a small plant, a vine, and a shrub. Poison Ivy occurs in every state. The leaves always consist of three glossy leaflets. **Poison Sumac** grows as a woody shrub or small tree 5 to 25 feet (1.5 to 7.5 m) tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause a mild to severe allergic reaction, referred to as "contact dermatitis". These plants are found in the U.S. and Canada.

Dermatitis, in Rhus-sensitive persons, may result from contact with the milky sap found in the roots, stems, leaves, and fruit, and may be carried by contacted animals, equipment or apparel.

The best form of prevention is to avoid contact. Wearing long sleeves and gloves, and disposable clothing, such as Tyvek, is recommended in high-risk areas to avoid exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

### 7.13.3 INSECTS

#### Ticks

Ticks are blood feeding external parasites of mammals, birds, and reptiles throughout the world. Some human diseases of current interest in the U.S. caused by tick-borne



pathogens include Lyme disease, ehrlichiosis, babesiosis, rocky mountain spotted fever, tularemia, and tick-borne relapsing fever. Lyme disease is caused by a bacterial parasite called spirochete and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in a newsprint. The peak months for human infection are June through October. There are many other tick borne diseases such as Rocky Mountain Spotted Fever, which can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

### *Prevention*

Preventative measures include wearing light-colored clothing, keeping clothing buttoned, tucking pant legs in socks, and keeping shirttails tucked in. Periodic checks for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off.

The most common repellent recommended for ticks is N,N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container for use with all insecticides especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts, or abrasions. Use soap and water to remove DEET once indoors.

### *Removal*

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the Site of attachment and use a firm steady pull to remove it. When removing the tick, be certain to remove all the mouth parts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed. Get medical attention if necessary.

### *Symptoms of Lyme Disease*

The first symptoms of Lyme Disease usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick attached, and is often bulls eye like with red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or "doughy" and appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from original rash. Symptoms often disappear after a few weeks.

### Bees, Wasps, and Yellow Jackets

Insects that sting are members of the order Hymenoptera of the class Insecta. There are two major subgroups: aphids (honeybees, bumblebees) and vespids (wasps, yellow jackets, hornets). Aphids are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detaches after a sting. Vespids have few barbs and can inflict multiple stings.

Types of stinging insects that might be encountered on a site may include:

- Carpenter Bees
- Bumblebees
- Mud Dauber Wasps
- Africanized Killer Bees
- Cicada Killer Wasps
- Giant Hornets
- Honeybees
- Paper Wasps
- Yellow Jackets

### *Symptoms*

If you are stung there are three types of reactions you can have, a normal, a toxic, or an allergic reaction.

- Normal reaction - only lasts a few hours and consists of pain, redness, swelling, itching, and warmth near the sting area
- Toxic reaction - will last for several days and results from multiple stings and may cause cramps, headaches, fever, and drowsiness
- Allergic reaction - might cause hives, itching, swelling, tightness in the chest area and a possibility of breathing difficulties, dizziness, unconsciousness, and cardiac arrest

The stingers of many Hymenoptera may remain in the skin and should be removed as quickly as possible without concern for the method of removal. An ice cube placed over the sting will reduce pain. Persons with known hypersensitivity to such stings should carry a kit containing epinephrine in a prefilled syringe. Antihistamines may help decrease hives and angioedema. Persons who have severe symptoms of anaphylaxis, have positive venom skin test results, and are at risk for subsequent stings should receive immunotherapy regardless of age or time since anaphylaxis.

### *Precautions*

The following precautions can help you avoid stings. Try to wear light colored clothing and shy away from dark or floral prints. Avoid wearing perfumes, hairsprays, colognes, and scented deodorants while working outside. If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects as well. Never swat or swing at the insect, it is best to wait for it to leave, softly blow it away, or gently brush it aside. Seek medical attention when the reaction to a sting includes swelling, itching, dizziness or shortness of breath.

If physical control measures are not effective, use a pesticide that will have a minimal impact on both you and the environment.

### Fire Ants

Fire ants are reddish-brown in color and range from 1/8 inch to 3/8 inch in length. They have a narrow "waist" with two segments. They live in decaying logs or soil, clumps of grass or under leaves or mounds. Mounds vary in size depending on the size of the colony. Usually they are about 18 inches across and 8 to 12 inches tall. The ants tend to build mounds in open, sunlit, grassy areas near irrigation or other water sources. Mounds in sandy soil tend to be irregularly shaped and mounds in clay soils tend to be symmetrical and dome shaped.

### *Bites and Stings*

When a fire ant stings an individual, the individual is rarely only stung once. Most fire ant stings result in a raised welt with a white pustule. If stung by a fire ant, continue to observe the welt and try to prevent secondary infection by keeping the welt intact. However, some individuals may have an allergic reaction to a fire ant sting and require immediate medical attention.



### *If You Are Stung:*

If you are stung by a fire ant, there are a few things you can do to help reduce the pain and itching, chance of infection, and the need for further medical attention.

- Move away from the nest to prevent more bites.
- Remove all clothes as soon as you can (there may be ants still in them)
- Wash the affected area with cold soapy water
- Ice the affected area to calm swelling
- Use alcohol to disinfect the area
- Be careful not to open the bite blisters

### *Prevention*

The best way to avoid fire ant bites is to avoid fire ants. Unfortunately, that is not always possible.

To prevent bites and stings:

- Be cautious around large open areas
- Avoid applying strongly scented lotions. Fire ants tend to approach strong scents easily
- Keep an eye on the ground to watch for ant activity. If you can, stick to the shade and cooler areas, as fire ants prefer sunny locations
- If you notice the pinch of a fire ant bite, brush the ant off quickly before it has a chance to sting
- Always wear high socks, boots, pants and gloves when working. It may help by taping the pant cuff to the boot

Additionally these steps can prevent spreading:

- Avoid bringing back nursery stock, plants, sod, firewood, hay or straw, or other items in which ants could hitchhike
- Inspect all vehicles, including cars or RVs, to ensure no ants are inside
- Inspect clothing and equipment used on Site to ensure no ants are attached



Fire ants are prevalent in the southern states and are now being found in areas within New Brunswick, Quebec, and Ontario.

### Mosquitoes

Mosquitoes are common pests that can be found in any state and any work environment where warm, humid conditions exist. Mosquitoes can pass along diseases such as West Nile virus and Malaria. Several different methods can be used to control adult mosquito populations: repellants such as DEET, mosquito traps, foggers, and vegetation and water management. Mosquitoes are found from the tropics to the Arctic Circle and from lowlands to the peaks of high mountains.

## 7.13.4 VENOMOUS SPIDERS

### Black Widow

Black Widow spiders are not usually deadly (especially to adults) and only the female is venomous. The female spider is shiny black, usually with a reddish hourglass shape on the underside of her spherical abdomen. Her body is about 1.5 inches (4 cm) long while the adult male's is approximately half that. The spider's span ranges between 1 and 3 inches (2.5 and 8 cm). The adult males are harmless, have longer legs, and usually have yellow and red bands and spots over their back, and the young black widows are colored orange and white. The bite of a black widow is often not painful and may go unnoticed. However, the venom injected by the spider's bite can cause severe reactions in certain individuals.

### *Symptoms*

Symptoms that may be experienced include abdominal pain, profuse sweating, swelling of the eyelids, pains to muscles or the soles of the feet, salivation and dry-mouth (alternating), and paralysis of the diaphragm. If a person is bitten, they should seek immediate medical attention. Clean the area of the bite with soap and water. Apply a cool compress to the bite location. Keep effected limb elevated to about heart level. Additional information can be obtained from the Poison Center (1-800-222-1222).

Black widows are found throughout the tropics, the U.S., and Canada.

## Brown Recluse

Brown recluse spiders are usually light brown in color, but in some instances they may be darker. Brown recluse spiders are highly venomous spiders, native to the U.S. and found coast to coast. The brown recluse can vary in size, but some can obtain bodies of 5/8 inches (1.5 cm) in length with a leg span of 1 ½ inches (4 cm) in diameter. They can be identified by their three pairs of eyes along the head area and their fiddle shaped markings on the back. Most brown recluse bites are defensive rather than offensive. They generally only bite when they feel threatened.

### *Symptoms*

If bitten by a brown recluse, an individual may experience open, ulcerated sores, which when left untreated may become infected and cause tissue necrosis. If an individual believes a spider has bitten them, they need to seek medical attention as soon as possible. In order to minimize the occurrence of brown recluse bites, individuals should shake their clothing and shoes thoroughly, eliminate the presence of cluttered areas, and spray the building perimeters with pesticides.

Brown recluse are found throughout the United States.

## 7.13.5      THREATENING DOGS

If you are approached by a frightened or menacing dog:

- Do not attempt to run and don't turn your back
- Stay quiet, and remember to breathe
- Be still, with arms at sides or folded over chest with hands in fists
- Slowly walk away sideways
- Don't stare a dog in the eyes, as this will be interpreted as a threat
- Avoid eye contact
- If you have a jacket, you could wrap it around your arm and should he snap, take the bite harmlessly
- Try calling its bluff. Yell "sit!", "stay!", or "go home!". You might convince the dog that you are the stronger in the situation

### 7.13.6 RODENTS

*Rodentia (rats, mice, beavers, squirrels, guinea pigs, capybaras, coypu):*

Rodents, or Rodentia, are the most abundant order of mammals. There are hundreds of species of rats; the most common being the black and brown rat.

Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

There are six major problems caused by rats and mice:

- They eat food and contaminate it with urine and excrement
- They gnaw into materials such as paper, books, wood, or upholstery, which they use as nest material. They also gnaw plastic, cinder blocks, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard
- Rats occasionally bite people and may kill small animals
- They, or the parasites they carry (such as fleas, mites, and worms), spread many diseases such as salmonella, trichinosis, rat bite fever, Hantavirus, Weils disease, and the bubonic plague
- Rats can damage ornamental plants by burrowing among the roots or feeding on new growth or twigs. They also eat some garden vegetables, such as corn and squash
- Rats and mice are socially unacceptable. These rodents have been a problem for centuries, chiefly because they have an incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs

### 7.13.7 SNAKES

Snakes may be found in any region of North America. While many snakes encountered are not venomous, a few are; so it is best that you give a wide berth to all snakes. Of the 7,000 venomous snakebites reported each year, only about 15 prove to be fatal; so your chances of survival are extremely high. The usual snake encounter is one in which they



see you before you see them, and they slither away from you quickly, startling you. If you see a snake, back away from it slowly and do not touch it. If you or someone you know are bitten, try to see and remember the color and shape of the snake, which can help with treatment of the snakebite.

Venomous snakes include the Coral Snake, Cobra, and Pit Vipers, such as the Cottonmouth (Water Moccasin), Copperhead, and Rattlesnake. The venom of pit vipers is primarily hemotoxic because it acts upon the victim's blood system. This venom breaks down blood cells and blood vessels and affects heart action. Bite victims experience severe burning pain, localized swelling and discoloration for the first 3 to 30 minutes, followed by nausea, vomiting, occasional diarrhea, and usually shock.

### *Preventing Snakebites*

Watching where you step, put your hands, or sit down is one of the best ways to prevent snakebites. Venomous snakes live on or near the ground and often like rocks, woodpiles, and other spots that offer both a place to sun and a place to hide. Most bites occur in and around the ankle. About 99 percent of all bites occur below the knee, except when someone accidentally picks up or falls on the snake.

Watching where you step and wearing boots in tall grass can prevent most snakebites. Another means to protect against snakebites is snake chaps.

### *Emergency First Aid for Venomous Snakebite*

Although it is important to obtain medical aid immediately, emergency first aid can slow the spread of poison from the bite. Remain calm and avoid unnecessary movement, especially if someone is with you. The rate of venom distribution throughout your body will be slower if you are still and quiet. **Do not** use home remedies, and **do not** drink alcoholic beverages.

In addition, learn the following procedures so you do not waste time before getting medical attention.

If less than 60 minutes is required to reach a hospital or other medical aid, follow this procedure:

- Apply a constricting band 2 to 4 inches (5 to 10 cm) on each side of the bite. The band should be loose enough to slip your finger under without difficulty, so that you



do not cut off circulation completely. Properly applied, the constricting band can be left safely in place for 1 hour without adjustment

- If ice is available, place some in a towel, shirt, or other piece of cloth and apply it to the bite area. Do not bind it to the bite, but keep it loosely in place. Do not use the ice pack for more than 1 hour. The objective is to cool the venom and slow its action, but not to freeze the tissue
- The primary function of the constricting band and ice pack is to slow the spread of venom through your body. Remove them slowly so there will not be a sudden rush of venom through your blood stream

#### 7.13.8 SCORPIONS

There are 40 different types of scorpions found in the United States. All the different types are located in the southern United States.

##### The Southern Devil Scorpion

The Southern Devil Scorpion (also called the Plain Eastern Stripeless Scorpion and the Southern Stripeless Scorpion) is the only kind of scorpion known to live in Kentucky. It is about 2 inches long when fully grown, and is fairly common in wooded areas in the southeastern United States. Southern devil scorpions are usually found around rocky hillsides. Crumbling rock faces, brick walls, leaf-covered areas, and log piles are favorite habitats. Dense ground cover, such as leaf litter or mulches, tall grass, wood piles, or general clutter provide excellent protection for scorpions and the small creatures that they eat.

##### *Stings*

Encounters occur when people disturb these "shelters". Scorpions are not aggressive but will raise their pinchers and tail in an attempt to scare away anything that bothers them. They will strike if touched or accidentally grabbed. A venom, produced by a pair of glands located near the end of the tail, is injected by the stinger. The sensation is a sharp pain that usually lasts for 15 to 20 minutes. Reactions can vary depending on age or sensitivity of the individual and the amount venom injected.

### *Sting Prevention*

- Inspect openings, cracks, or similar areas before placing fingers/hands into
- Inspect equipment and carefully shake out clothing prior to donning
- Wear thick protective gloves (leather work gloves)
- Wear appropriate foot wear

### *If Stung*

Most stings produce a red, raised bump with pain similar to that of a bee. Pain lasts for up to a few hours and may be accompanied by swelling or tingling of the area. Symptoms should disappear within 24 hours.

- Ice the area to ease the pain
- If there is prolonged swelling or increased pain the individual should seek medical attention
- If the sting causes an allergic reaction seek medical help

## 7.14 ENVIRONMENTAL CONTROL PROGRAM

This section outlines measures to be implemented at the Site to prevent hazards associated with environmental conditions.

### 7.14.1 WEATHER MONITORING

The on-Site CRA Representative will be responsible for checking weather forecasts for the next day and week of work to provide advance notification of any severe weather conditions. Severe weather conditions (e.g., heavy rains) may cause unsafe conditions at the Site and in some situations work may have to be stopped.

### 7.14.2 RAIN AND SNOW

Excessive amounts of precipitation may cause potential safety hazards for all work tasks. The hazards would be most commonly associated with slipping, tripping, or

falling due to slippery surfaces and further hazards are detailed by work task (refer to the specific JSA).

Severe weather conditions will result in work stoppage and the implementation of further emergency measures, as described in the CRA Health and Safety SOP.

#### 7.14.3 THERMAL STRESS

The drilling and soil sampling activities are expected to be conducted during the spring. High temperatures may be experienced which require measures to be implemented to prevent health and safety hazards from occurring. Temperature stress is one of the most common illnesses that project personnel face when working during periods when temperatures and/or humidity are elevated. Acclimatization and frequent rest periods must be established for conducting activities where temperature stress may occur. Below are listed signs and symptoms of heat stress. Personnel should follow appropriate guidelines if any personnel exhibit these symptoms.

#### 7.14.4 HEAT STRESS

Heat stress is caused by a number of interacting factors including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted with direct solar load and in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat Rashes: Are one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.



Heat Cramps: Are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much and too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3 percent NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat Exhaustion: Occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat Stroke: Is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating



(usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

#### *Heat Stress Safety Precautions*

Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described below.

<i>Adjusted Temperature<sup>(1)</sup></i>	<i>Work-Rest Regimen Normal Work Ensemble<sup>(2)</sup></i>	<i>Work-Rest Regimen Impermeable Ensemble</i>
90°C (32°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5 to 90°F (30.8 to 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5 to 87.5°F (28.1 to 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5 to 82.5°F (25.3 to 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5 to 77.5°F (30.8 to 32.2°C)	After each 150 minutes of work	After each 120 minutes of work

Notes:

- (1) Calculate the adjusted air temperature ( $t_{a \text{ adj}}$ ) by using this equation:  
 $t_{a \text{ adj}}^{\circ}\text{F} = t_a^{\circ}\text{F} + (13 \times \text{percent sunshine})$ . Measure air temperature ( $t_a$ ) with a standard thermometer, with the bulk shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows).
- (2) A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

In order to determine if the work rest cycles are adequate for the personnel and specific Site conditions, additional monitoring of individual heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one-third and maintain the same rest period.

Additional one or more of the following control measures can be used to help control heat stress and are mandatory if any Site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute:

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day
- On-Site drinking water will be kept cool (50 to 60°F)
- A work regimen that will provide adequate rest periods for cooling down will be established, as required

- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps
- Cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat
- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary
- A shaded rest area must be provided. All breaks should take place in the shaded rest area
- Employees must not be assigned to other tasks during breaks
- Employees must remove impermeable garments during rest periods. This includes Tyvek® garments
- All employees must be informed of the importance of adequate rest, acclimation (usually takes about 2 hours/day for 1 to 2 weeks to become acclimated), and proper diet in the prevention of heat stress disorders.

#### 7.14.5 COLD STRESS

Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F (37°C), can be life threatening. A drop in core temperature to 95°F (35°C) or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind-chill must be considered as it contributes to the effective temperature and insulating capabilities of clothing. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the body's core temperature.

The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of accidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly and numb extremities make for



increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F (35°C). This must be taken as a sign of danger to the employees on Site, and cold exposures should be immediately terminated for any employee when severe shivering becomes evident. Useful physical or mental work is limited when severe shivering occurs.

#### 7.14.6 PREDISPOSING FACTORS FOR COLD STRESS

There are certain predisposing factors that make an individual more susceptible to cold stress. It is the responsibility of the project team members to inform the SHO to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- Dehydration: The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities
- Fatigue During Physical Activity: Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat
- Age: Some older and very young individuals may have an impaired ability to sense cold
- Alcohol Consumption: Alcohol dilates the blood vessels near the skin surface resulting in excessive body heat loss
- Sedative Drugs: Sedatives may interfere with the transmission of impulses to the brain, thereby interfering with the body's physiological defense against cold. Some prescription drugs may react the same way
- Poor Circulation: Vasoconstriction of peripheral vessels reduces blood flow to the skin surface
- Heavy Work Load: Heavy workloads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed



by the individual's clothing and is in contact with the skin, cooling of the body will occur

- The Use of PPE: PPE usage which traps sweat inside the PPE may increase an individual's susceptibility to cold stress
- Lack of Acclimatization: Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions
- History of Cold Injury: Previous injury from cold exposures may result in increased cold sensitivity

#### 7.14.7 PREVENTION OF COLD STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

##### Acclimatization

Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiologic changes are usually minor and require repeated uncomfortably cold exposures to induce them.

##### *Fluid and Electrolyte Replenishment*

Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, non-alcoholic drinks and soup are good sources to replenish body fluids.

##### *Eating a Well Balanced Diet*

Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high-energy foods throughout the day.

## *Warm Clothing*

It is beneficial to maintain air space between the body and outer layers of clothing in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

Recommended cold weather procedures include:

- Inner layers (t-shirts, shorts, and socks) should be of a thin, thermal insulating material
- Wool or thermal trousers. Denim is not a good protective fabric
- Felt-lined, rubber-bottomed, leather-upper boots with a removable felt insole is preferred. Change socks when wet
- Wool shirts/sweaters should be worn over inner layer
- A wool cap is good head protection. Use a liner under a hard hat
- Mittens are better insulators than gloves
- Face masks or scarves are good protection against wind
- Tyvek/poly-coated Tyvek provides good wind protection
- Wear loose fitting clothing, especially footwear
- Carry extra clothing in your vehicle
- Shelters with heaters should be provided for the employees' rest periods if possible. Sitting in a heated vehicle is a viable option. Care should be taken that the exhaust is not blocked and that windows are partially open to provide ventilation
- At temperatures of 30°F (-1°C) or lower, cover metal tool handles with thermal insulating material if possible
- Schedule work during the warmest part of the day if possible, rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress

It may not be practically feasible to implement all the above prevention measures. Follow the guidelines given below when the ambient air temperature is below 0°F (-18°C):

- Dress warmly
- Replenish fluids and electrolytes at regular intervals
- Provide shelter from the cold
- Adjust work/rest schedules

#### 7.14.8 FIRST AID GUIDELINES FOR COLD STRESS

The following describes symptoms of different stages in cold stress and the related first aid treatment guidelines.

##### Frostbite

##### *Stages*

Incipient (frost nip)	May be painless. Tips of ears, nose, cheeks, fingers, toes, chin affected. Skin blanched white
Superficial	Affects skin/tissue just beneath skin; turns purple as it thaws. Skin is firm, waxy; tissue beneath is soft, numb
Deep	Tissue beneath skin is solid, waxy, white with purplish tinge. Entire tissue depth is affected

##### *First Aid*

Incipient	Warm by applying firm pressure - blow warm breath on spot or submerge in warm water (102°F to 110°F) (39°C to 43°C). Do not rub the area
Superficial	Provide dry coverage, steady warmth; submerge in warm water
Deep	Hospital care is needed. Do not thaw frostbitten part if needed to walk on. Do not thaw if there is danger of re-freezing. Apply dry clothing over frostbite. Submerge in water; do not rub

## General Hypothermia

### *Stages*

- Shivering
- Indifference
- Decreased consciousness
- Unconsciousness
- Death

### *Symptoms*

- Muscle tension
- Uncontrollable shivering
- Glassy stare
- Decreased muscle function
- Speech distortion
- Blue, puffy skin
- Slow pulse
- Shallow breathing
- Coordination loss
- Stumbling
- Forgetfulness
- Freezing extremities
- Dilated pupils
- Fatigue

### *Emergency Response*

- Keep person dry; replace wet clothing
- Apply external heat to both sides of patient using available heat sources, including other bodies
- Give warm liquids - not coffee or alcohol - after shivering stops and if conscious
- Handle gently



- Transport to medical facility as soon as possible
- If more than 30 minutes from a medical facility, warm person with other bodies

#### 7.14.9 WIND

High winds may be encountered at the Site and these can cause hazards that may affect Site personnel health and safety. Preventative measures that will be implemented if necessary are as follows:

- Restricted Site activity
- Battening down light equipment or building materials
- Partially enclosing work areas
- Reduction or stoppage of work related activities

## 8.0 AIR MONITORING

This section of the HASP presents the requirements for conducting air monitoring at the Site. The air monitoring program is designed to ensure protection for both personnel working on Site and the surrounding community. The on-Site monitoring program will be conducted by the on-Site CRA Representative and will consist of monitoring Site personnel exposures to VOCs, SVOCs and dust particulate. This monitoring will be completed with the use of real-time monitoring instruments.

Identification of volatile organic vapor or particulate levels in excess of the action levels cited in Table B.6.2 shall be reported to the Regional Safety and Health Manager who, in conjunction with the on-Site CRA Representative, will determine when PPE should be upgraded or operations be shut down and restarted.

If work is stopped because action levels have been exceeded, air monitoring will continue from a safe distance to determine if there is a threat to the surrounding community.

### On-Site Air Monitoring

The on-Site CRA Representative will perform air monitoring to evaluate the exposure of Site personnel to chemical and physical hazards, verify the effectiveness of engineering controls, and determine the proper level of PPE. Air quality will be monitored at the initiation of each work activity and periodically thereafter. Background measurements immediately upwind of the EZ will be taken before activities commence.

During the progress of excavation activities, the on-Site CRA Representative will monitor the levels of VOCs, SVOCs, and dust particulate. The following monitoring equipment will be used for this purpose:

- A PID equipped with a 11.7 eV or greater lamp
- MIE PDR pDR-1000A Data Ram dust monitor

All instruments will be calibrated on a daily basis in accordance with the manufacturer's guidelines. Records of all calibrations and real-time measurements will be kept in a bound field log book.

An EZ perimeter air monitoring program will also be implemented. PID and particulate monitoring will be conducted on an hourly basis or more frequently as necessary at the

perimeter of the EZ in order to evaluate the effectiveness of Site control measures and verify the integrity of the Site's clean areas. If necessary, the SHO in conjunction with the SS will adjust the EZ and CRZ boundaries.

#### Real-Time VOC Monitoring

The on-Site CRA Representative will monitor for the presence of VOCs based on Site characteristics, historical data, work being conducted in a previously uncharacterized area, etc. PID readings will be taken in and around the EZ. Action levels for upgrading or downgrading of PPE have been established by the USEPA for atmospheres containing unknown concentrations of VOCs.

#### Real-Time Dust Monitoring

The on-Site CRA Representative will monitor for the presence of particulate using the MIE PDR pDR-1000AN personal DataRam Monitor which is a direct reading aerosol photometer. The DataRam monitor is designed to detect aerosol dust or respirable dust in the ambient air. Aerosol is a term to describe fine particulates (solid or liquid) suspended in air. Concentrations are evaluated ranging between 0.001 to 400 mg/m<sup>3</sup>, respectively.

### **8.1      HEALTH AND SAFETY ACTION LEVELS**

An action level is a point at which increased protection or cessation of activities is required due to the concentration of contaminants in the work area. All activities shall be initiated as identified in Table B.6.1. The appropriate actions are to be taken at designated action levels. The initial action levels for Site work are listed in Table B.6.2.

In addition to the action level, an upgrade to Level C is required if:

- Any symptoms occur, as described in Section 3.0
- Requested by an individual performing the task
- Any irritation to eye, nose, throat, or skin occurs

A work stoppage and evacuation (cease and desist) at the specific work area is required if levels in the breathing zone exceed the protection factor of the respirator.



## 10.0 DECONTAMINATION PROCEDURES

In general, everything that enters the EZ at the Site must either be decontaminated or properly discarded upon exit from the EZ. All personnel, including any state and local officials, must enter and exit the EZ through the decontamination area. Prior to demobilization, potentially contaminated equipment will be decontaminated and inspected by the on-Site CRA Representative before it is moved into the clean zone.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for this Site is Liquinox (soap) for equipment and for any reusable PPE. MSDS for Liquinox and all other chemical containing products will be maintained on Site by the on-Site CRA Representative.

### 10.1 EQUIPMENT DECONTAMINATION PROCEDURES

An Equipment Decontamination Facility will be constructed and operational before any work begins involving contact with potentially contaminated material. All equipment must be decontaminated within the CRZ or on the decontamination pad by a high pressure washer upon exit from the EZ. All waste transport vehicles must be inspected and clean prior to leaving the Site. Decontamination procedures should include: knocking soil/mud from machines; water rinsing using a solution of water and Liquinox; scraping and brushing with long-handled brushes to remove remaining soils and a final water rinse. Particular attention should be paid to tire treads, equipment tracks, springs, joints, sprockets, and under carriages. Equipment will be allowed to air dry in a clean zone before being moved from the Site or travelling onto clean areas. Personnel shall wear Level C or Modified D protection when decontaminating equipment. Modified D protection may be used if authorized by the on-Site CRA Representative. Runoff and sediments will be collected and stored until appropriate disposal arrangements are made. Appropriate measures (i.e., wind shields) will be taken to minimize the drift of mist and spray during decontamination. Following decontamination and prior to equipment removal from the Site or travel on clean areas, each piece of equipment will be inspected by the on-Site CRA Representative to ensure that the equipment has been properly cleaned. This inspection shall be included in the Site log book.

In general, equipment decontamination pads should be installed and operated under the following guidelines:



- Sized for the width and weight of the heaviest equipment expected, leaving sufficient room for decontamination equipment, personnel, and waste fluid storage drums
- Provide an impermeable barrier capable of containing all decon liquids
- Durably constructed to withstand the wear and tear of equipment tires/tracks
- Provided with a low point sump where all decon fluids can be collected and pumped out
- Be constructed such that a minimum amount of materials will require special disposal when the decontamination pad is decommissioned. The use of granular fills or stone as the primary load-bearing surface should be avoided
- The length of the decontamination pad need not be sufficient to contain the entire vehicle. The vehicle can be decontaminated in sections as it passes over the pad
- If possible, vehicle access into the work zone should be made around the decontamination pad rather than over it. This will reduce the wear and tear on the pad. If such access is made possible, the pad should remain blocked whenever it is not in use

An equipment decontamination inspection record will be maintained on Site, which includes:

- Equipment descriptions with identification numbers or license plates
- Time and date entering decontamination facility
- Time and date exiting the decontamination facility
- Name of inspector(s) with comment stating that decontamination was performed and completed

## 10.2 PERSONNEL DECONTAMINATION PROCEDURES

Personnel decontamination will be completed in accordance with the CRA Health and Safety SOP for personnel decontamination. Washwater and sediments will be collected and stored with materials generated during equipment decon procedures. PPE, trash, etc. within the CRZ will be bagged and treated as potentially contaminated waste. It will be kept separate from trash generated in clean areas of the Site. The general guidelines for this are described in Section 6.6.

## 11.0 PERSONAL HYGIENE

Site sanitation will be maintained according to OSHA and Department of Health requirements.

### 11.1 BREAK AREA

Eating at the Site is prohibited except in specifically designated areas. Breaks must be taken in the SZ, away from the active work area after Site personnel go through decontamination procedures. Designation of eating areas will be the responsibility of the on-Site CRA Representative. The location of these areas may change during the duration of the project to maintain adequate separation from the active work area(s).

There shall be no smoking, eating, drinking, or chewing gum or tobacco in any area other than the SZ.

### 11.2 POTABLE WATER

The following rules apply for all project field operations:

- An adequate supply of potable water will be provided at each work Site. Potable water must be kept away from hazardous materials, contaminated clothing, and contaminated equipment
- Portable containers used to dispense drinking water must be capable of being tightly closed, and must be equipped with a tap dispenser. Water must not be drunk directly from the container, nor dipped from the container
- Containers used for drinking water must be clearly marked and not used for any other purpose
- Disposable cups must be supplied, and both a sanitary container for unused cups and a receptacle for disposing of used cups must be provided

### 11.3 SANITARY FACILITIES

Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be

changed. Hands must be washed with soap and water before eating, drinking, smoking, and using toilets.

Access to facilities for washing before eating, drinking, or smoking will be provided.

#### 11.3.1 LAVATORY

If permanent toilet facilities are not available, an adequate number of portable chemical toilets will be provided.

#### 11.4 TRASH COLLECTION

All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the on-Site CRA Representative. Wastes will be stored until proper disposal arrangements have been made.

Trash collected from the CRZ will be separated as potentially contaminated waste. Trash collected in the support and break areas will be disposed of as non-hazardous waste. Trash receptacles will be set up in the CRZ and in the SZ.

## 12.0 MEDICAL SURVEILLANCE

In accordance with the requirements detailed in 29 CFR 1926.65 and 29 CFR 1910.134, all Site personnel who will come in contact with materials with potentially elevated chemical presence will have received, within 1 year prior to starting field activities, medical surveillance by a licensed physician or physician's group.

Medical records for all on-Site personnel will be maintained by their respective employers. The medical records will detail the tests that were taken and will include a copy of the consulting physician's statement regarding the tests and the employee's suitability for work.

The medical records will be available to the employee or his/her designated representative upon written request, as outlined in 29 CFR 1910.1020.

Each employer will provide certifications to the on-Site CRA Representative that its personnel involved in Site activities will have all necessary medical examinations and will have obtained medical certification prior to commencing work which requires respiratory protection or potential exposure to hazardous materials. Personnel not obtaining medical certification will not perform work within the CRZ and EZ.



### 13.0 EMERGENCY RESPONSE

It is essential that Site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate. In general, CRA personnel will shut down equipment and evacuate to a safe predetermined meeting area during Site emergencies.

All accidents involving property damage and personal injury are to be reported by calling the CRA hotline 1-866-529-4886. Provide the following information:

- Name and location of the caller
- Name of injured persons, if applicable
- Description of the accident
- Description of the injuries, if applicable
- Telephone number for a return call

Any work-related incident, accident, injury, illness, exposure, or property loss must be reported to your supervisor **within 1 hour** through the CRA Incident Reporting System. Motor vehicle accidents must also be reported through this system. CRA's Incident Report Form, located in Attachment B-3, must also be filled out and provided to your supervisor. The report must be filed for the following circumstances:

- Accident, injury, illness, or exposure of an employee
- Injury of a subcontractor
- Damage, loss, or theft of property

A motor vehicle accident which, regardless of fault, involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment.

A **Near Loss** means an undesired event or incident that under slightly different circumstances could have resulted in personal injury, illness, environmental release, or loss. Only a fortunate break in the chain of events prevented an injury, fatality, or damage. Although human error is commonly an initiating event, a faulty process or system invariably permits or compounds the harm, and should be the focus of

improvement. CRA's Near Loss Report Form, located in Attachment B-2-1, must also be filled out and provided to the SS.

### 13.1 EMERGENCY CONTACTS

Fire..... 911  
 Police (Brazos County Sheriff Department)..... 911  
 Ambulance..... 911  
 Hospital: Caritas Medical Center  
 1850 Bluegrass Avenue #1  
 Louisville, Kentucky..... 502-361-6000

#### Directions to the Hospital

A Hospital Route Map is included as Figure B.13.1.

1. From 6100 Campground Road, go northeast for 1.2 miles
2. Turn right on Kramers Lane and go southeast for 0.9 miles
3. Turn right on Cone Run Road and go southwest of 1,000 feet
4. Turn left on Crums Lane and go east for 2.2 miles
5. Turn right Manslick Road and go south for 0.7 miles
6. Turn left on Bluegrass Avenue and go east for 900 feet to 1850 Bluegrass Avenue.

### 13.2 ADDITIONAL EMERGENCY NUMBERS

National Response Center (NRC)..... 800-424-8802  
 Agency for Toxic Substances and Disease Registry..... 404-488-4100 (24 Hours)  
 Poison Information..... 502-589-8222  
 USEPA Emergency Response..... 800-424-8802  
 Astra Zeneca (Client) Representative (Carol Dickerson)..... 302-886-5123  
 On-Site Groundwater Treatment Plant Operator (Jeff Lower)..... 502-448-4931  
 513-771-3617 (cell phone)  
 CRA Project Manager (Jamie Puskas)..... 519-884-0510  
 CRA Regional Safety and Health Manager (Wayne St.Denis)..... 519-497-6660  
 CRA On-Site Representative (TBD).....

### 13.3 EMERGENCY EQUIPMENT AVAILABLE ON SITE

	<i>Location</i>
<b>Communication Equipment</b>	
Emergency alarms/horns	CRZ
<b>Medical Equipment</b>	
OSHA approved first aid kit	CRZ or
Portable emergency eyewash	Support Zone
<b>Fire Fighting Equipment</b>	
Two 20-pound ABC type dry chemical fire extinguishers	CRZ
One fire extinguisher in cab of each piece of heavy equipment	

### 13.4 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES

As the administrator of the HASP, the on-Site CRA Representative has primary responsibility for responding to and correcting emergency situations. The on-Site CRA Representative will:

- Take appropriate measures to protect personnel including: withdrawal from the EZ, total evacuation and securing of the Site or upgrading or downgrading the level of protective clothing and respiratory protection
- Take appropriate measures to protect the public and the environment including isolating and securing the Site, preventing runoff to surface waters and ending or controlling the emergency to the extent possible
- Ensure that the client representative and appropriate federal, state, and local agencies are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted
- Ensure that appropriate decontamination treatment or testing for exposed or injured personnel is obtained



- Determine the cause of the incident and make recommendations to prevent the recurrence
- Ensure that all required reports have been prepared

### 13.5 MEDICAL EMERGENCIES

Any person who becomes ill or injured in the EZ must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed as much as possible without causing further harm to the patient. First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the on-Site CRA Representative.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated as necessary.

### 13.6 FIRE OR EXPLOSION

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the on-Site CRA Representative, or designated alternate, will advise the fire commander of the location, nature, and identification of the hazardous materials on Site.

If it is safe to do so, Site personnel may:

- Report to the Project Manager and the Client representative
- Use fire fighting equipment available on Site
- Remove or isolate flammable or other hazardous materials which may contribute to the fire



### 13.7 SPILLS OR CONTAINER LEAKS

In the event of a spill or leak, Site personnel will:

- Report spills and releases to the Project Manager, the Client representative, the NRC, and State Emergency Response Commission (SERC)
- Locate the source of the spillage and stop the flow if it can be done safely
- Begin containment and recovery of the spilled materials

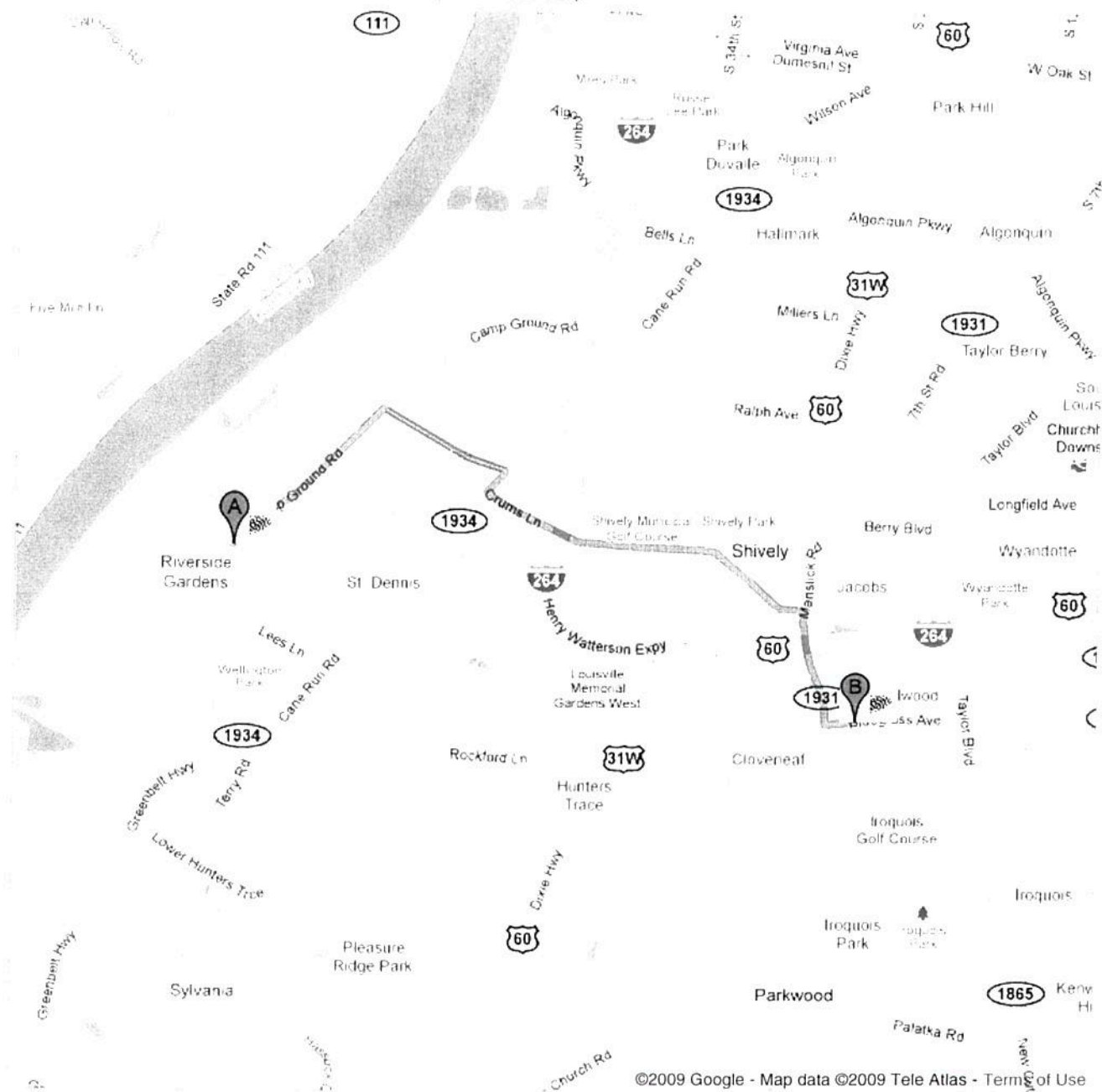
#### 14.0 RECORDKEEPING

The on-Site CRA Representative shall establish and maintain records of all necessary and prudent monitoring activities as described below:

- Name and job classification of the employees involved on specific tasks
- Records of qualitative fit testing and physical examination results for Site personnel
- Documentation of air monitoring results and calibration logs
- Records of all OSHA/applicable safety training certification for Site personnel
- Records of training acknowledgment forms
- Emergency reports describing any incidents or accidents

Google maps

Directions to 1850 Bluegrass Ave, Louisville,  
KY 40215, USA  
5.3 mi – about 13 mins  
figure B.13.1  
Hospital Route Map














**Stauffer Chemical Co**

6100 Camp Ground Rd, Shively, KY 40216, United States - (502) 448-2640

1. Head **northeast** on **Camp Ground Rd** toward **Bramers Ln**  
About 2 minsgo 1.2 mi  
total 1.2 mi
-  2. Turn **right** at **Kramers Ln**  
About 2 minsgo 0.8 mi  
total 2.0 mi
-  3. Turn **right** at **Cane Run Rd/KY-1934**  
About 1 mingo 0.2 mi  
total 2.2 mi
-  4. Turn **left** at **Crums Ln**  
About 6 minsgo 2.2 mi  
total 4.4 mi
-  5. Turn **right** at **KY-1931/Manslick Rd**  
About 2 minsgo 0.7 mi  
total 5.1 mi
-  6. Turn **left** at **Bluegrass Ave**  
Destination will be on the right  
About 1 mingo 0.2 mi  
total 5.3 mi



**1850 Bluegrass Ave, Louisville, KY 40215, USA**

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2009 Tele Atlas



TABLE B.2.1

EXPOSURE ROUTES AND LIMITS  
FOR ON-SITE CHEMICALS  
INTERIM CORRECTIVE MEASURE  
SOUTH LANDFILL/CURTAIN AREA  
ATKEMIX TEN INC.  
6100 CAMPGROUND ROAD  
LOUISVILLE, KENTUCKY

<i>Chemical Compound</i>	<i>Ionization Potential (eV)</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels In Air</i>	<i>IDLH Levels<sup>(3)</sup></i>
1,1,2,2-Tetrachloroethane	11.10	Inhalation Ingestion Skin contact Eye contact	TLV: 1 ppm [skin] PEL: 5 ppm [skin] STEL: NE	100 ppm
1,2,4-Trichlorobenzene	N/A	Inhalation Skin absorption Ingestion Skin contact Eye contact	TLV: C 5 ppm PEL: N/A STEL: C 5 ppm	NE
1,4-Dichlorobenzene	8.98	Inhalation Ingestion Skin contact Eye contact	TLV: NE PEL: 75 ppm STEL: NE	Ca [150 ppm]
Acetone	9.69	Inhalation Ingestion Skin contact Eye contact	TLV: 250 ppm PEL: 1,000 ppm STEL: 750 ppm	2,500 ppm
Carbon tetrachloride	11.47	Inhalation Ingestion Skin contact absorption Eye contact	TLV: 2 ppm [skin] PEL: 10 ppm STEL: 10 ppm	200 ppm
Chloroform	11.42	Inhalation Ingestion Skin contact absorption Eye contact	TLV: NE PEL: 50 ppm (C) STEL: 2 ppm	500 ppm
Cyclohexane	9.86	Inhalation Ingestion Skin contact Eye contact	TLV: 100 ppm PEL: 300 ppm STEL: NE	1,300 ppm
Methyl acetate	10.9	Inhalation Ingestion Skin contact Eye contact	TLV: 200 ppm PEL: 200 ppm STEL: 250 ppm	3,100 ppm
Methyl cyclohexane			TLV: 500 ppm PEL: 400 ppm STEL: NE	9.85 ppm
Methylene chloride	11.32	Inhalation Ingestion Absorption	TLV: 50 ppm PEL: 25 ppm STEL: 125 ppm	2,300 ppm

TABLE B.2.1

EXPOSURE ROUTES AND LIMITS  
FOR ON-SITE CHEMICALS  
INTERIM CORRECTIVE MEASURE  
SOUTH LANDFILL/CURTAIN AREA  
ATKEMIX TEN INC.  
6100 CAMPGROUND ROAD  
LOUISVILLE, KENTUCKY

<i>Chemical Compound</i>	<i>Ionization Potential (eV)</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels In Air</i>	<i>IDLH Levels<sup>(3)</sup></i>
Tetrachloroethene	9.32	Inhalation Ingestion	TLV: 25 ppm PEL: 100 ppm	150 ppm
Toluene	8.82	Absorption Inhalation Ingestion	STEL: 100 ppm TLV: 100 ppm [skin] PEL: 200 ppm	500 ppm
Trichloroethene	9.45	Absorption Inhalation Ingestion	STEL: 150 ppm (C) TLV: 50 ppm PEL: 100 ppm	1,000 ppm
Xylene	8.56	Absorption Inhalation Absorption Ingestion	STEL: 100 ppm TLV: 100 ppm PEL: 100 ppm STEL: 150 ppm	900 ppm
2-Methylnaphthalene	--	--	--	--
Acenaphthene	--	--	--	--
Acenaphthylene	--	--	--	--
Acetophenone	--	--	--	--
Anthracene	--	--	--	--
Benzaldehyde	--	--	--	--
Benzo(a)anthracene	--	--	--	--
Benzo(a)pyrene	--	--	--	--
Benzo(b)fluoranthene	--	--	--	--
Benzo(g,h,i)perylene	--	--	--	--
Benzo(k)fluoranthene	--	--	--	--
Biphenyl (1,1-Biphenyl)	--	--	--	--
bis(2-Ethylhexyl)phthalate	NE	Inhalation Skin contact Eye contact	TLV: 5 mg/m <sup>3</sup> PEL: TWA 5 mg/m <sup>3</sup> STEL: N/A	Ca 5,000 mg/m <sup>3</sup>
Butyl benzyl phthalate	NE	Inhalation Skin contact Eye contact Ingestion	TLV: NE PEL: NE STEL: 5 mg/m <sup>3</sup>	NE
Carbazole	--	--	--	--
Chrysene	Varies	Inhalation Skin contact Eye contact	TLV: 0.1 mg/m <sup>3</sup> PEL: .2 mg/m <sup>3</sup> STEL: NE	80 mg/m <sup>3</sup>
Dibenz(a,h)anthracene	--	--	--	--
Dibenzofuran	--	--	--	--



TABLE B.2.1

EXPOSURE ROUTES AND LIMITS  
FOR ON-SITE CHEMICALS  
INTERIM CORRECTIVE MEASURE  
SOUTH LANDFILL/CURTAIN AREA  
ATKEMIX TEN INC.  
6100 CAMPGROUND ROAD  
LOUISVILLE, KENTUCKY

<i>Chemical Compound</i>	<i>Ionization Potential (eV)</i>	<i>Exposure Routes</i>	<i>Acceptable Exposure Levels In Air</i>	<i>IDLH Levels<sup>(3)</sup></i>
Di-n-butyl phthalate	NE	Inhalation Ingestion Skin contact Eye contact	TLV: NE PEL: 5 mg/m <sup>3</sup> STEL: NE	4,000 mg/m <sup>3</sup>
Di-n-octyl phthalate	--	--	--	--
Fluoranthene	NE	Absorption Inhalation Ingestion	TLV: 0.2 mg/m <sup>3</sup> PEL: 0.2 mg/m <sup>3</sup> STEL: NE	NE
Fluorene	15.70	Inhalation Skin contact Eye contact	TLV: 0.1 ppm PEL: 0.1 ppm (ceiling) STEL: 2 ppm	25 ppm
Hexachlorobenzene	NE	Inhalation Ingestion Skin contact absorption Eye contact	TLV: 0.025 mg/m <sup>3</sup> [skin] PEL: NE STEL: NE	NE
Hexachlorobutadiene	NE	Inhalation Ingestion Skin contact absorption Eye contact	TLV: 0.02 mg/m <sup>3</sup> [skin] PEL: NE STEL: NE	NE
Hexachloroethane	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	--	--	--
Naphthalene	8.12	Inhalation Ingestion Skin contact absorption Eye contact	TLV: 10 ppm PEL: 10 ppm STEL: 15 ppm	250 ppm
Phenanthrene	--	--	--	--
Pyrene	NE	Absorption Inhalation	TLV: 0.2 mg/m <sup>3</sup> PEL: 0.2 mg/m <sup>3</sup> STEL: NE	NE

TABLE B.2.1

EXPOSURE ROUTES AND LIMITS  
FOR ON-SITE CHEMICALS  
INTERIM CORRECTIVE MEASURE  
SOUTH LANDFILL/CURTAIN AREA  
ATKEMIX TEN INC.  
6100 CAMPGROUND ROAD  
LOUISVILLE, KENTUCKY

## Notes:

(TLV)	2001 Values, American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs)
(PEL)	Federal Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL)
(STEL)	Short Term Exposure Limits from Material Safety Data Sheet (MSDS)
(IDLH)	Immediately Dangerous to Life and Health (IDLH). United States National Institute for Occupational Safety and Health
mg/m <sup>3</sup>	Milligrams per cubic meter
NI	Not established
ppm	Parts per million

TABLE B.2.2

MAXIMUM LEVELS ABOVE KYDEP PRG STANDARD  
 INTERIM CORRECTIVE MEASURE  
 SOUTH LANDFILL/CURTAIN AREA  
 ATKEMIX TEN INC.  
 6100 CAMPGROUND ROAD  
 LOUISVILLE, KENTUCKY

<i>Parameter</i>	<i>KYDEP PRG Industrial Standard μg/kg</i>	<i>PRG mg/kg</i>	<i>Maximum Detected Level in Work Area μg/kg</i>	<i>Maximum Detected Level in Work Area mg/kg</i>	<i>Location</i>	<i>Depth (ft bgs)</i>
Tetrachloroethene	1,300	1.30	1,500	1.5	B-121	0-1
Benzo(a)pyrene	210	210	260	0.26	SS-110	0-1
Hexachlorobenzene	1,100	1.10	1,500,000	1,500	B-122	0-1
Hexachlorobutadiene	22,000	22	32,000	32	SS-118	0-1

**TABLE B.6.1**  
**SPECIFIC PERSONAL PROTECTION LEVELS**  
**SOUTH LANDFILL/CURTAIN AREA**  
**ATKEMIX TEN INC.**  
**6100 CAMPGROUND ROAD**  
**LOUISVILLE, KENTUCKY**

<i>Work Task</i>	<i>Initial Protection Level<sup>(1)</sup></i>	<i>Alternate Protection Level<sup>(2)</sup></i>
Mobilization and demobilization of labor, materials, and equipment to and from the Site	Modified Level D	Level D
Figure B.3.1 - Clearing, excavation, material handling/ transportation and general remediation of contaminated soils in Zones 2, 3a, 3c, 4, and the Consolidating Area	Level C/Level B	Modified Level D
Figure B.3.1 - Clearing, excavation, material handling/ transportation and general remediation of contaminated soils in Zones 1, 3b, 5, and 6	Modified Level D	Level C/Level B
Placement of topsoil, seed and mulch over designated areas	Modified Level D	Level D
General restoration of all affected areas	Modified Level D	Level D
Personnel and equipment decontamination activities	Level C	Modified Level D

Notes:

Specific requirements for protection levels are detailed in Section 6.1.

- (1) Level B: To be worn when the highest level of respiratory protection is needed and only after consultation with the Health and Safety Officer and CRA's Industrial Hygiene and Safety Group.  
Level C: To be worn when the criterion for using air purifying respirators (APRs) are met and a lesser level of skin protection is needed.  
Modified Level D: To be worn when dermal protection is required; however, no respiratory hazards are present. It provides minimal protection against chemical hazards.
- (2) Alternate protection levels will be used if monitoring indicates that conditions are appropriate or the Health and Safety Officer and Site Superintendent agree that there is a change in potential of exposure



TABLE B.6.2

ON-SITE AIR MONITORING PROGRAM ACTION LEVELS  
SOUTH LANDFILL/CURTAIN AREA  
ATKEMIX TEN INC.  
6100 CAMPGROUND ROAD  
LOUISVILLE, KENTUCKY

<i>Monitoring Device</i>	<i>Action Level</i>	<i>Personal Protective Equipment/Action</i>
Photoionization Detector (PID with a lamp of minimum energy 11.7 eV) (continuous use)	0 to <5 m deflection units	Modified Level D. Continue working.
	5 to 25 m deflection units	Level C. Don full-face respirator equipped with, at minimum, combination organic vapor and particulate (i.e., P-100) cartridges.
	>25 m deflection units	Cease operations, stop work, and move upwind to a safe location. Contact Health and Safety Officer and re-evaluate work plan. Do not resume work until supplemental protective measures have been taken or airborne concentrations decrease to within an acceptable range.
Aerosol Monitor (continuous use)	0 to <0.3 mg/m <sup>3</sup> reading	Modified Level D. Continue working.
	>0.3 mg/m <sup>3</sup> to <50 mg/m <sup>3</sup> reading	Level C. Don full-face respirator equipped with, at minimum, combination organic vapor and particulate (i.e., P-100) cartridges.
	>50 mg/m <sup>3</sup> reading	Upgrade to Level B or cease operations, stop work, and move upwind to a safe location. Contact Health and Safety Officer and re-evaluate work plan. Do not resume work until supplemental protective measures have been taken or airborne concentrations decrease to within an acceptable range.
	Visible dust	Wetting of the soil will be used to control dust and spread of contaminated particulate to other work areas.

Note:

The on-Site Health and Safety Officer shall be notified whenever an action level has been exceeded.



ATTACHMENT B-1

TRAINING ACKNOWLEDGEMENT FORM





## TRAINING ACKNOWLEDGEMENT FORM

I have received instruction in and understand the Site Safety Plan. I have been informed who to contact if I have any questions and know where to report any additional health and safety hazards. I agree to work to the safety plan guidelines and understand that failure to do so could result in removal from the Site.

[illegible]

